CHAPTER 1
PURPOSE OF AND NEED FOR ACTION

1.1 INTRODUCTION

This chapter discusses the purpose and need for the proposed action, the action's objectives, the planning and decision areas; provides a brief background on geothermal resources and the leasing and development process; details the relationship of the proposed action to existing policies and plans; and outlines the scope of the analysis for the proposed action, the decisions to be made after analysis, and issues to be addressed based on internal and external scoping.

The Energy Policy Act of 2005 (Public Law 109-58, August 8, 2005) establishes a goal for the Secretary of the Interior to approve 10,000 megawatts (MW) of electricity from non-hydropower renewable energy projects located on public lands. The 10,000 MW of geothermal energy would support approximately 10,000,000 homes (Geothermal Energy Association 2012). Further, Secretarial Order 3285A1, amended February 22, 2010, establishes the development of environmentally responsible renewable energy as a United States (US) Department of Interior priority. The US Department of Agriculture, Forest Service (Forest Service) has obligations under Section 225 of the Energy Policy Act to facilitate the development and production of geothermal energy.

The State of Nevada, through the Renewable Portfolio Standard, has mandated that investor owned utilities generate, acquire or save at least 20 percent of their produced electricity from renewable energy systems by 2015. The State of California, a potential customer of Nevada's geothermal energy, has mandated that 33 percent of electrical power be derived from renewable energy sources by 2020. Geothermal resources, along with oil and gas, fall under the Forest Service Leasable Minerals Program. The Geothermal Steam Act of 1970 gives the Secretary of the Interior authority to issue geothermal leases on National Forest System lands and regulate subsurface geothermal activities through the US Department of Interior, Bureau of Land Management (BLM) [30 United States Code (USC) 1002, Sec.3].

In response to lease nominations and inquiries from industry, the BLM has requested the concurrence[1] of the Forest Service to lease National Forest System lands in the Humboldt-Toiyabe National Forest for future geothermal exploration, development, and production. BLM may only lease nominated National Forest System lands with Forest Service consent [43 Code of Federal Regulations (CFR) 3201.10(a) (2)]. Prior to providing concurrence to the BLM for leasing, the Forest Service is responsible for conducting a National Environmental Policy Act of 1969 (NEPA) analysis for leasing to determine appropriate lease stipulations under which leases may be developed and for ensuring that leasing decisions are consistent with the Humboldt and Toiyabe National Forests Land and Resource Management Plans (LRMPs).

In 2008, the BLM recommended, and the Assistant Secretary–Land and Minerals Management approved, the Record of Decision (ROD) associated with the *Programmatic Environmental Impact Statement (PEIS) for Geothermal Leasing in the Western United States*. The 2008 Geothermal PEIS and ROD were prepared pursuant to the planning requirements of the Federal Land Policy and Management Act of 1976, as amended (FLPMA), and its implementing regulations at 43 CFR Part 1600, as well as NEPA, and its implementing regulations at 40 CFR Parts 1500 through 1508. Decisions in the 2008 Geothermal ROD identified those lands that are legally open or closed to consideration for geothermal leasing on affected National Forest System lands, and provided stipulations, best management practices (BMPs), and procedures for geothermal leasing and development. The Forest Service has determined that additional site-specific environmental analysis is needed to supplement the 2008 Geothermal PEIS in order for the Forest Service to make a decision about providing concurrence/consent[1] to the BLM to lease lands in the Humboldt-Toiyabe National Forest for the purpose of developing geothermal resources.

The Forest Service's proposed action is to determine which lands in the Humboldt-Toiyabe National Forest on the Bridgeport, Austin, Tonopah, and Ely Ranger Districts would be available for geothermal leasing and under what stipulations.

1.2 PURPOSE OF AND NEED FOR THE ACTION

The purpose of the action is to determine if certain lands within the Humboldt-Toiyabe National Forest may be made available for geothermal leasing and, if so, to provide consent to leasing of lands and to identify reasonable and necessary stipulations to protect surface resources. The need for the action is to allow the Forest Service to satisfy its respective statutory and policy mandates in responding to requests for the environmentally responsible development of energy resources; to address provisions of the Energy Policy Act of 2005 (Sections 211 and 222[d][1]); and respond to other policy directives calling for clean and renewable energy.

[1] For purpose of this document, the words consent and concurrence have the same meaning.

1.3 DESCRIPTION OF THE PLANNING AND DECISION AREAS

The planning and decision areas for the Geothermal Leasing on the Humboldt-Toiyabe National Forest Environmental Impact Statement (EIS) encompass four separate areas on the Humboldt-Toiyabe National Forest. **Figure 1-1**, Humboldt-Toiyabe Geothermal Leasing Planning Area, shows the general locations of the four decision areas, **Figure 1-2**, Bridgeport Geothermal Decision Area, shows the location of the Bridgeport Ranger District analysis area and **Figure 1-3**, Austin, Ely, Tonopah Geothermal Decision Areas, shows the locations of the proposed geothermal analysis areas for the Austin, Tonopah, and Ely portions of the planning area.

The Bridgeport Geothermal Decision Area encompasses the Nevada portion of the Bridgeport Ranger District (approximately 607,560 acres) minus areas identified previously as non-consent and lands being analyzed under separate environmental analysis at the time of the EIS. The Tonopah Geothermal Decision Area covers approximately 166 acres. The Austin and Ely Geothermal Decision Areas cover approximately 3,961 acres and 3,538 acres, respectively. The four decision areas total approximately 615,225 acres, which make up the entire planning area analyzed in this EIS.

The Tonopah Geothermal Decision Area is adjacent to the Darroughs Hot Springs lease that was approved in the 2008 Geothermal PEIS and ROD (BLM and Forest Service 2008). This parcel was intended to be included with the Darroughs Hot Spring lease and was inadvertently omitted; therefore, this parcel would be processed as a noncompetitive lease. Various parcels in the Bridgeport, Austin, and Ely Geothermal Decision Areas would be processed through competitive lease sales.

Because of the interest in geothermal energy, and the recognized potential for geothermal resources on the eastern side of the Bridgeport Ranger District, the Humboldt-Toiyabe National Forest realizes that continued applications for leasing National Forest System lands for geothermal activity are likely. Therefore, the Humboldt-Toiyabe National Forest proposes analyzing not only the nominated areas across the Humboldt-Toiyabe National Forest and pending lease applications, but also the Nevada side of the Bridgeport District with a high geothermal interest. By incorporating portions of the Bridgeport District as well as nominated lands and pending lease applications under one EIS, future nominations and applications may be addressed and consent or non-consent provided to the BLM in a timely manner.

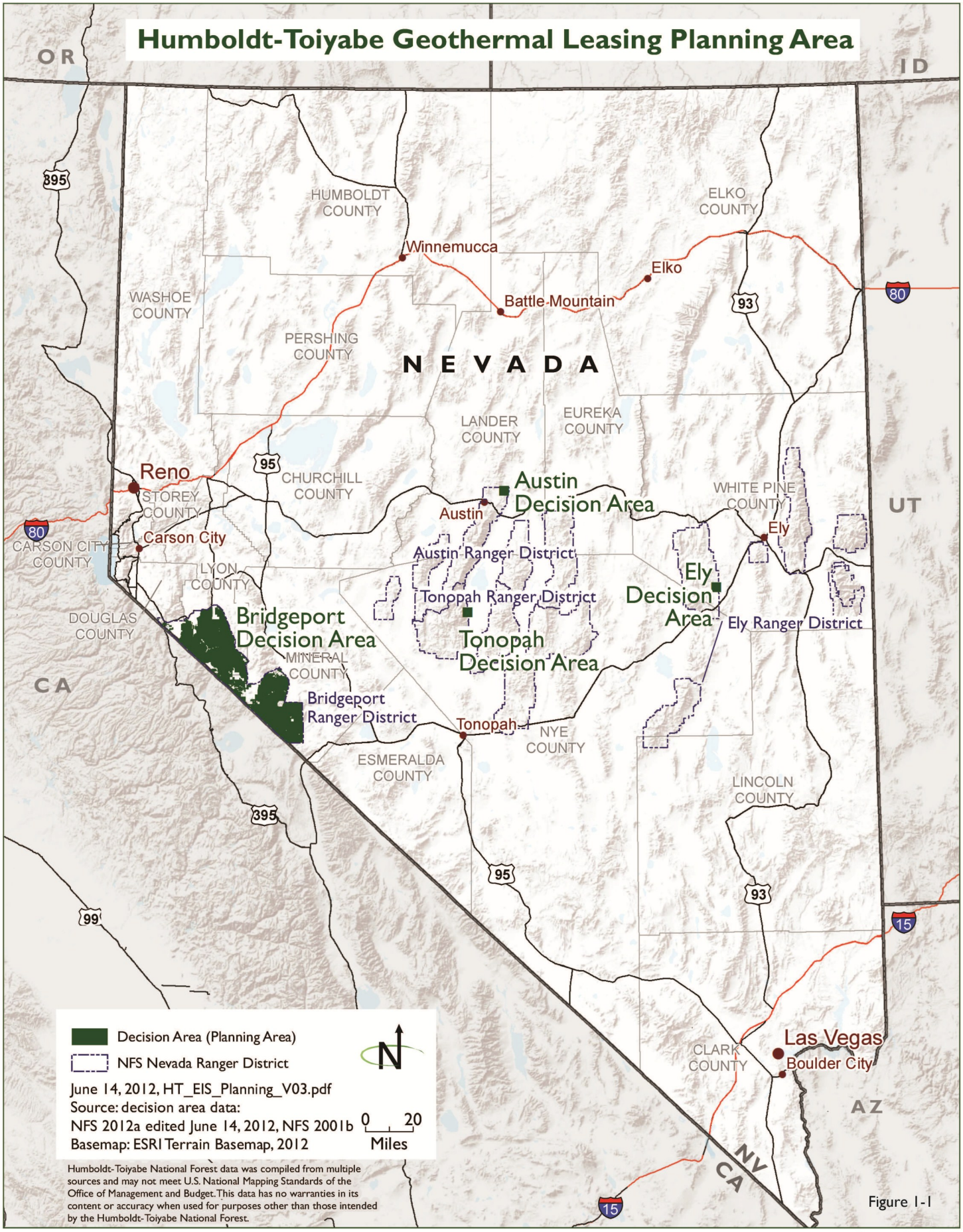

Humboldt-Toiyabe Geothermal Leasing Planning Area
OR
ID
UT
AZ
CA
NV
NEVADA
HUMBOLDT COUNTY
ELKO COUNTY
WASHOE COUNTY
PERSHING COUNTY
LANDER COUNTY
EUREKA COUNTY
CHURCHILL COUNTY
STOREY COUNTY
CARSON CITY COUNTY
LYON COUNTY
DOUGLAS COUNTY
MINERAL COUNTY
ESMERALDA COUNTY
NYE COUNTY
WHITE PINE COUNTY
LINCOLN COUNTY
CLARK COUNTY
Winnemucca
Elko
Battle Mountain
Reno
Carson City
Austin
Austin Decision Area
Austin Ranger District
Tonopah Ranger District
Tonopah Decision Area
Ely
Ely Decision Area
Ely Ranger District
Bridgeport Decision Area
Bridgeport Ranger District
Tonopah
Las Vegas
Boulder City
395
80
95
93
99
15
Decision Area (Planning Area)
NFS Nevada Ranger District
June 14, 2012, HT_EIS_Planning_V03.pdf
Source: decision area data:
NFS 2012a edited June 14, 2012, NFS 2001b
Basemap: ESRI Terrain Basemap, 2012
0 20
Miles
Humboldt-Toiyabe National Forest data was compiled from multiple sources and may not meet U.S. National Mapping Standards of the Office of Management and Budget. This data has no warranties in its content or accuracy when used for purposes other than those intended by the Humboldt-Toiyabe National Forest.

Figure 1-1

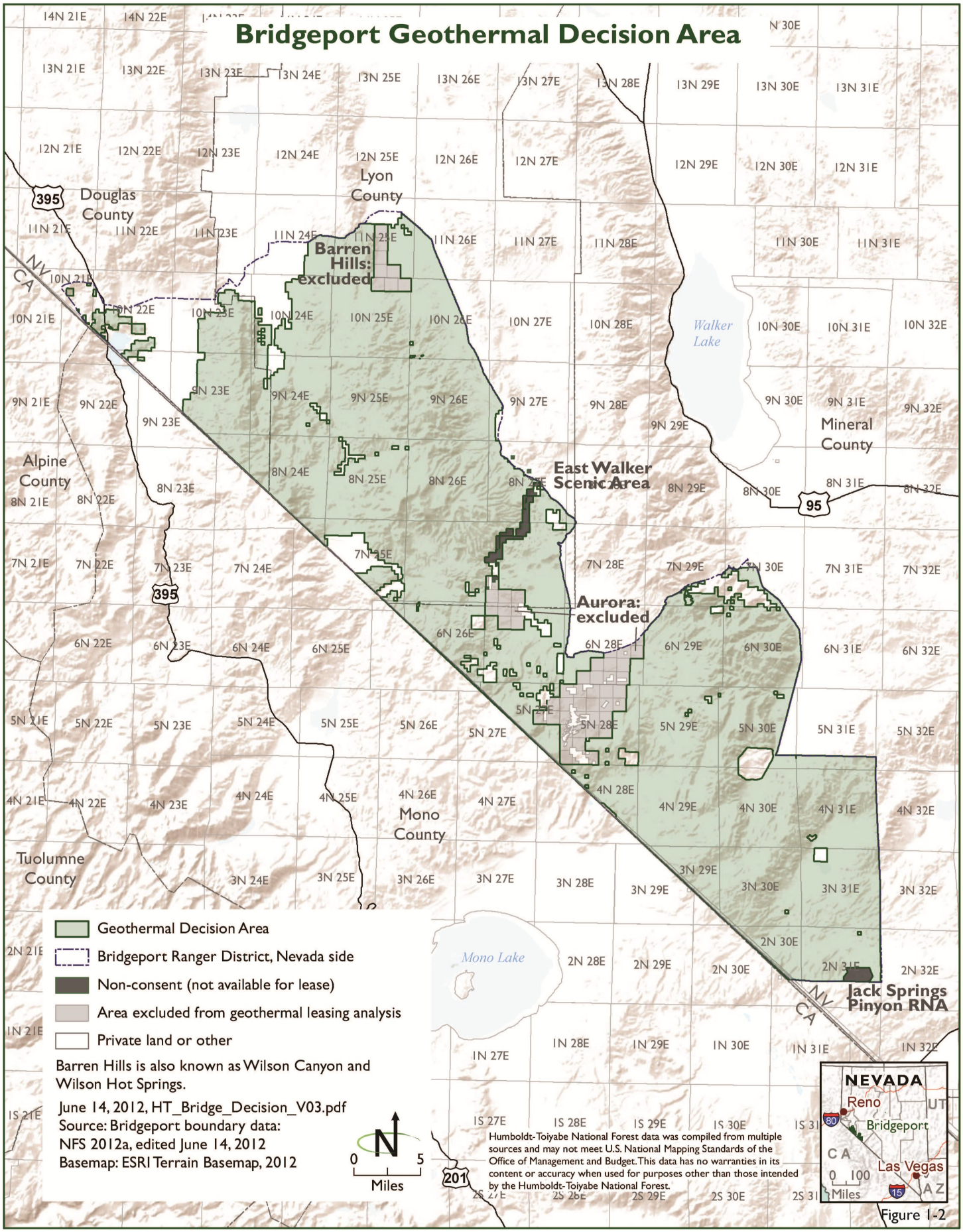
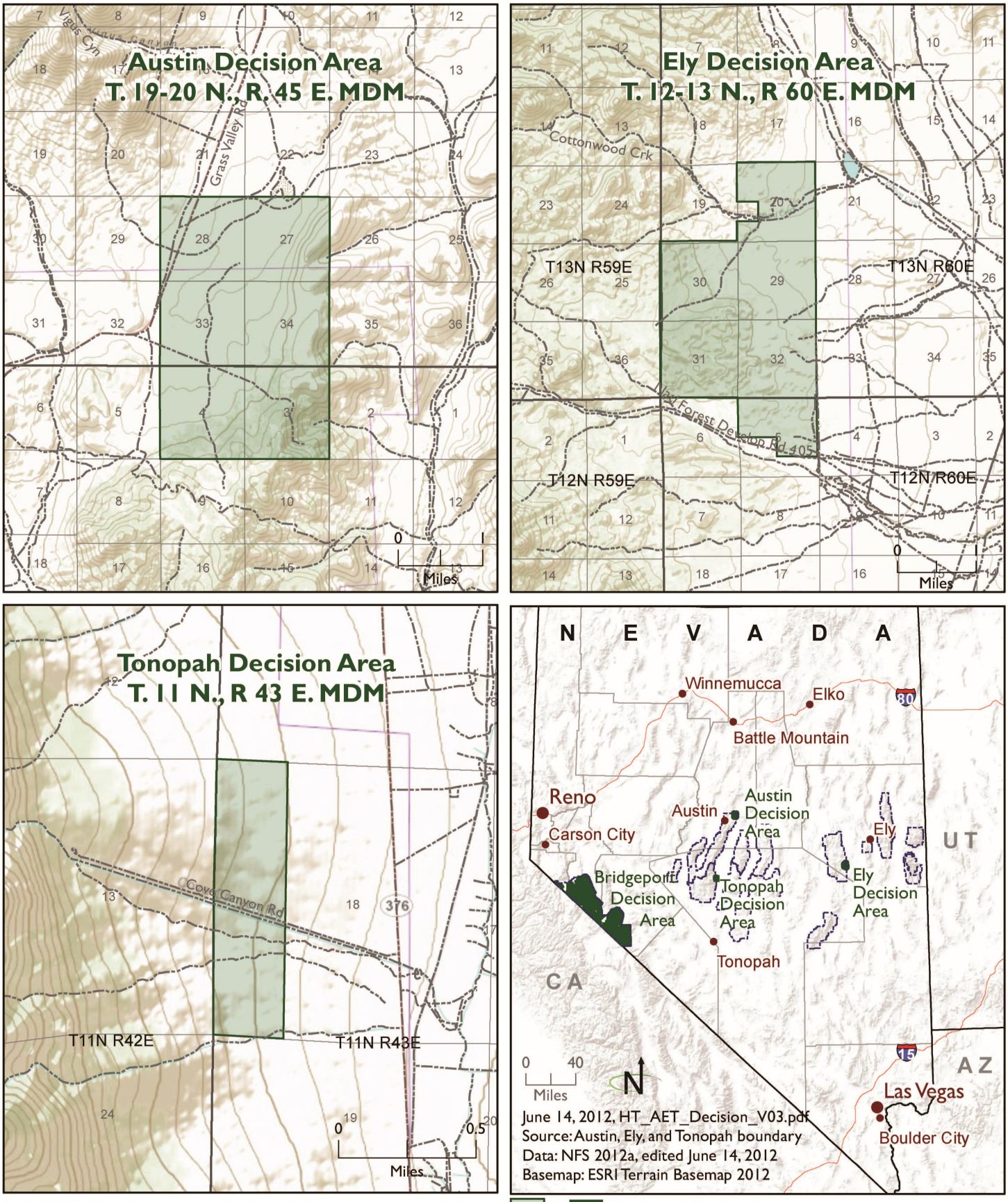

Bridgeport Geothermal Decision Area
Douglas County
Lyon County
Mineral County
Alpine County
Mono County
Tuolumne County
Barren Hills: excluded
East Walker Scenic Area
Aurora: excluded
Jack Springs Pinyon RNA
Walker Lake
Mono Lake
NV
CA
395
95
201
Geothermal Decision Area
Bridgeport Ranger District, Nevada side
Non-consent (not available for lease)
Area excluded from geothermal leasing analysis
Private land or other
Barren Hills is also known as Wilson Canyon and Wilson Hot Springs.
June 14, 2012, HT_Bridge_Decision_V03.pdf
Source: Bridgeport boundary data: NFS 2012a, edited June 14, 2012
Basemap: ESRI Terrain Basemap, 2012
N
0 5
Miles
Humboldt-Toiyabe National Forest data was compiled from multiple sources and may not meet U.S. National Mapping Standards of the Office of Management and Budget. This data has no warranties in its content or accuracy when used for purposes other than those intended by the Humboldt-Toiyabe National Forest.
NEVADA
Reno
Bridgeport
CA
UT
AZ
Las Vegas
0 100
Miles

Figure 1-2

Austin, Ely, Tonopah Geothermal Decision Areas



Humboldt-Toiyabe National Forest data was compiled from multiple sources and may not meet U.S. National Mapping Standards of the Office of Management and Budget. This data has no warranties in its content or accuracy when used for purposes other than those intended by the Humboldt-Toiyabe National Forest.

Figure 1-3

The decision resulting from this analysis would not affect any prior decisions on pending and existing geothermal leases or lands made available under previous Forest-Level Availability Determination Decisions. This decision would not make any leasing determination decisions on any lands being analyzed under separate environmental analysis at the time of the EIS.

1.4 BACKGROUND FOR GEOTHERMAL RESOURCES

The term *geothermal* comes from the Greek words *geo*, meaning earth, and *thermal*, meaning heat, as geothermal energy is derived from the natural heat of the earth. Geothermal resources are typically underground reservoirs of hot water or steam created by heat from the earth, but geothermal resources also include subsurface areas of dry hot rock. In cases where the reservoir is dry hot rock, the energy is captured through the injection of cool water from the surface, which is then heated by the hot rock and extracted as fluid or steam. Geothermal steam and hot water can naturally reach the earth's surface in the form of hot springs, geysers, mud pots, or steam vents. Geothermal reservoirs of hot water are also found at various depths beneath the Earth's surface. In the US, most geothermal reservoirs are located in the western states, Alaska, and Hawaii (NREL 2007). Geothermal resources can be accessed by wells and used to provide heat directly. This is called the direct use of geothermal energy. The heat energy can also be used to commercially generate electricity, a process called indirect use. As shown in **Figure 1-4**, Uses of Geothermal Energy, there are a wide range of uses for geothermal resources.

1.4.1 Direct Use

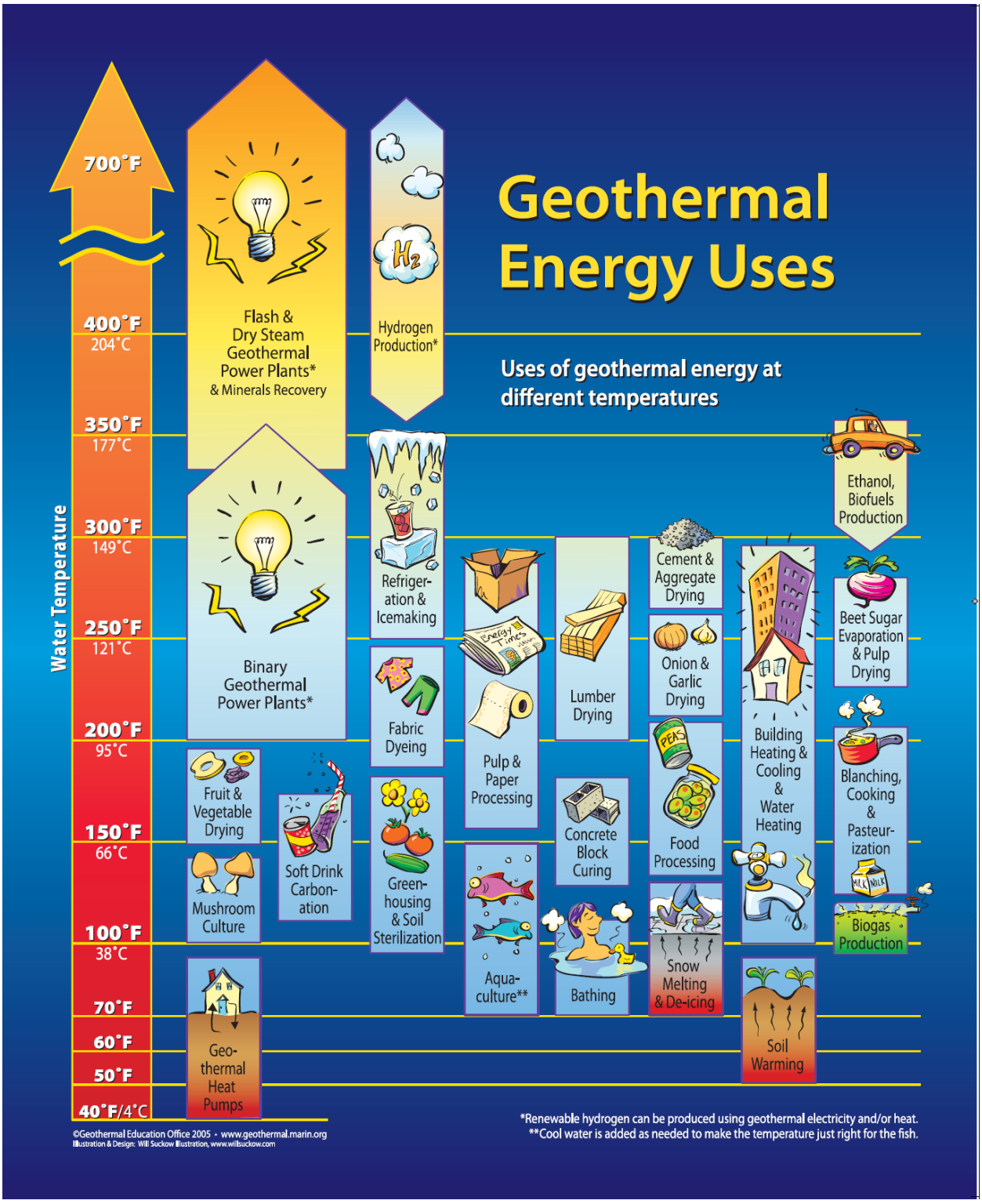
Humans have been using geothermal resources in the form of hot springs for thousands of years. Today, geothermal reservoirs of 68 degrees Fahrenheit (°F) to 302°F [20 degrees Celsius (°C) to 150°C] temperature water provide numerous opportunities for direct use. Direct use means utilization of geothermal resources for commercial, residential, agricultural, public facilities, or other energy needs other than the commercial production of electricity (43 CFR 3200.1). Direct uses of geothermal energy are described in detail in the 2008 Geothermal PEIS (BLM and Forest Service 2008).

Direct uses in the US have been growing at about six percent per year (Lund 2003). These low-temperature resources are fairly abundant throughout the West. A recent survey of 10 western states identified more than 9,000 thermal wells and springs, more than 900 low- to moderate-temperature geothermal resource areas, and hundreds of direct-use sites (WGA 2006; BLM and Forest Service 2008).

1.4.2 Commercial Electrical Generation

Commercial electrical generation from geothermal resources is also called indirect use. Electrical generation uses geothermally heated fluid to turn a turbine connected to a generator. As discussed below, the fluid may be the

Figure 1-4 Uses of Geothermal Energy



naturally occurring steam or water in the geothermal reservoir or another fluid which has the geothermal heat transferred through a heat exchange system.

Geothermal energy produces about 2,400 MW annually in the western US, supplying less than one percent of the US electrical demand (EIA 2007). It is estimated that the 12 Western states have 5,500 MW of geothermal potential considered viable for commercial development by 2015, with a further 6,600 MW being forecast by 2025 (BLM and Forest Service 2008).

Geothermal power plants can be small (generating 300 kilowatts), medium (generating 10 to 50 MW), and large (generating 50 MW and higher) (Nemzer et al. 2007). Generation capacity is guided by the number of turbines within a plant. In general, commercial electrical generation requires hot geothermal reservoirs with a water temperature above 200°F (93°C); however, new technologies have proven that lower-temperature water (e.g., 165°F [74°C]) can also be used for electrical generation (BLM and Forest Service 2008).

Three types of geothermal power plant systems are commonly used to generate electricity depending on temperature, depth, and quality of the water and steam in the area (US DOE 2007):

- flash steam;
- binary-cycle; and
- dry steam power plants.

These plants can also be hybridized by including elements of the different technologies at a single location. All three methods re-inject the remaining geothermal fluid back into the ground to replenish the reservoir and recycle the hot water. Geothermal power plant systems are described in detail in the 2008 Geothermal PEIS (BLM and Forest Service 2008).

1.5 LEASING AND DEVELOPMENT PROCESS OF GEOTHERMAL RESOURCES ON NATIONAL FOREST SYSTEM LANDS

1.5.1 Federal Geothermal Leasing Laws and Regulations

A federal geothermal lease grants "the exclusive right to drill for, extract, produce, remove, utilize, sell, and dispose of all the geothermal resources" in the lands described within the lease form. According to 43 CFR 3200.1 definitions, geothermal steam and associated geothermal resources are defined as (1) all products of geothermal processes, including indigenous steam, hot water, and brines; (2) steam and other gases, hot water, and hot brines resulting from water, gas, or other fluids artificially introduced into geothermal formations; (3) heat or other associated energy found in geothermal formations; and (4) any byproducts. The State of Nevada defines geothermal rights as a water right; therefore, geothermal developers must obtain the appropriate water rights and state permits, in addition to the federal lease for the resource.

The BLM has the delegated authority to issue geothermal leases on federal lands. It is the policy of the federal government, consistent with Section 2 of the Mining and Mineral Policy Act of 1970 and Sections 102(a)(7), (8), and (12) of the FLPMA (43 USC 1701 et seq.), to encourage the development of mineral resources, including geothermal resources, on federal lands. The Geothermal Steam Act of 1970 (30 USC Section 1001, et seq.), which was amended and supplemented by the Energy Policy Act of 2005, provides statutory guidance for geothermal leasing by the BLM. New federal geothermal development regulations (43 CFR Parts 3000, 3200, and 3280 – Geothermal Resource Leasing and Geothermal Resources Unit Agreements) were made effective June 1, 2007 (72 Federal Register 24358, May 2, 2007), as a result of a directive provided in the Energy Policy Act of 2005. These statutes and regulations delineate lands that are available and unavailable for leasing.

1.5.2 Leasing Process, Rights, and Limitations

The BLM grants access to geothermal resources through a formalized leasing process based on the end use. For direct uses, an applicant can apply noncompetitively for a lease. For indirect use, such as commercial electrical generation, the BLM awards leases through a competitive bidding process. Historically, certain lands were designated as known geothermal resource areas. All lands designated within known geothermal resource areas were leased through a competitive bidding process. Prior to the passage of the Energy Policy Act of 2005, lands outside of known geothermal resource areas could be leased noncompetitively. Section 222 of the Energy Policy Act of 2005 modified the Geothermal Steam Act of 1970 to allow only competitive lease sales for all federal geothermal resources and their associated lands with the following exceptions: (1) parcels of land that did not receive bids in a competitive sale; (2) lands available exclusively for direct use; (3) lands with a mining claim and a current approved plan of operations; and (4) lands for which a lease application was pending on August 8, 2005, if the applicant so chooses. Lease areas are nominated by the public for a lease sale.

When the BLM receives a nomination, it is adjudicated and configured into lease parcels by the respective BLM state office. Lease parcels are then forwarded to the appropriate Forest Service office where the appropriate environmental analysis and review is conducted.

The four stages of geothermal resource development within a lease are exploration, drilling operations, utilization, and reclamation and abandonment. Each stage requires a permit from the BLM, and is described in detail in Chapter 2 of the 2008 Geothermal PEIS (BLM and Forest Service 2008). Leasing geothermal resources by the BLM vests with the lessee a non-exclusive right to future exploration and an exclusive right to produce and use the geothermal resources within the lease area, subject to existing laws, regulations, formal orders, and the terms, conditions and stipulations in or attached to the lease form or included as Conditions of Approval (COAs) to permits. ***Lease issuance***

alone does not authorize any ground-disturbing activities to explore for or develop geothermal resources without site-specific approval for the intended operation. Such approval could include additional environmental reviews and permits. Also at each stage, the BLM can issue site-specific COAs to protect resource values.

A lease is issued for a primary term of 10 years and may be extended for two five-year periods. BLM will extend the primary term for five years if the lessee has satisfied the minimum work requirement or made a payment to BLM equivalent to the required work such that the total of the payment and the value of the work performed equals $40 per acre, or submit documentation to BLM that geothermal resources are produced or utilized in commercial quantities (43 CFR 3207.10 and 3207.11). Once commercial production is established, the lease may receive a production extension of up to 35 years and a renewal period of up to 55 years. The lease must continue to produce to remain in effect. BLM may grant a suspension of operations and production on a lease when justified by the operator (43 CFR 3207).

Geothermal exploration and production on federal land conducted through leases is subject to lease terms and stipulations, and must also comply with all applicable federal and state laws pertaining to various considerations for tribal interests, sanitation, air quality, solid waste, scenic values, roads, water quality, wildlife, safety, cultural resources, and reclamation.

1.6 NEVADA GEOTHERMAL POTENTIAL

In order to assess where geothermal development could occur, the BLM, in partnership with the Forest Service, US Department of Energy (DOE), and US Geological Survey (USGS) conducted a detailed evaluation of the literature and state of the science to create a geothermal potential map for the 2008 Geothermal PEIS. PEIS Figure 1-5, Areas of Geothermal Potential in Nevada (BLM and Forest Service 2008), illustrates the geothermal potential area, focusing on areas where there may be underground reservoirs of hot water or steam created by heat from the earth, or that have subsurface areas of dry hot rock in Nevada. Based on this information, BLM assumed that these were the most likely areas where the BLM would receive geothermal lease nominations and applications (BLM and Forest Service 2008).

Primary data sources for assessing geothermal potential included scientific literature; government, academic, and industry sources; and other public stakeholders. The BLM initially reviewed geothermal potential maps from various sources and identified the assessments most commonly accepted by government agencies involved in geothermal research and development and the geothermal industry (BLM and Forest Service 2008).

1.6.1 Resource Geography

High-temperature (greater than 302°F [150°C]) resources suitable for electric power production are located primarily in the northwest portion of the state,

while direct-use occurs state-wide, particularly in regard to food processing plants. There are several geothermal research facilities in the state, and field investigations are ongoing to further characterize geothermal resources (NCMR 2008; US DOE 2007).

1.6.2 Utilization

Nevada is second to California in levels of geothermal electricity production. Direct-use in the state consists primarily of agricultural drying and industrial applications such as mining (Lund 2003).

1.6.3 Technical Capabilities

Nevada universities, state agencies, and private firms contribute technical capabilities to the local and national geothermal communities. The Great Basin Center for Geothermal Energy, part of the University of Nevada at Reno, conducts geologic research and has produced a database of Nevada's geothermal resources to accelerate projects in the Great Basin region. Additionally, the University of Nevada at Reno, Redfield branch campus includes the Renewable Energy Center, which is quickly becoming a research, education and outreach resource for geothermal and other renewable technologies for Nevada.

1.6.4 Electrical Power Generation and Capacity

There are currently 22 operating geothermal power plants in Nevada with a total operating capacity of 449 MW (GEA 2012). In early 2012, Ormat Technologies brought its Tuscarora power plant online, adding 18 MW, and US Geothermal completed its first phase of expansion on its San Emidio power plant, adding 12.75 MW (GEA 2012).With more developing projects than any other state, it is expected that Nevada's geothermal generating capacity will increase significantly in the future. In addition to the 59 geothermal projects in development, 17 geothermal prospects with potential for power production have been identified by developers in Nevada (GEA 2012). The manner in which Nevada has combined federal and state efforts to develop geothermal resources has been very effective and could serve as a model for other states (Battocletti 2005).

1.7 Relationship to Forest Service Plans, Policies, and Programs

1.7.1 Humboldt National Forest and Toiyabe National Forest Land and Resource Management Plans

The Humboldt-Toiyabe National Forest operates under the direction of the RODs for the Humboldt and Toiyabe LRMPs, as amended. The standards and guidelines outlined in the LRMPs, or other standards and guidelines effective at the time of leasing, would be implemented as appropriate. The plans provide management goals and direction in relation to minerals, including geothermal:

Humboldt National Forest LRMP

Management Goals

Minerals – Goal #36 (page IV-10): Administer the mineral resources of the Humboldt National Forest to provide for the needs of the American people and to protect and conserve other resources.

Minerals – Goal #38 (page IV-10): Expedite oil and gas and geothermal activities.

Objectives

a. Evaluate exploration permit applications and administer those permits issued (seismic and other methods).

b. Evaluate and forward recommendations through the Regional Forester to BLM for geothermal lease applications.

c. Process oil and gas and geothermal lease applications through the State Office and District Offices as quickly as possible.

Minerals – Goal #40 (page IV-11): Integrate the exploration and development of mineral and energy resources with the use and protection of other resources. Use special stipulations identified in Appendix H of the LRMP for mineral leases.

Objectives

a. Provide for Forest Interdisciplinary Team input on exploration, development and extraction plan proposals.

b. Complete mineral evaluations for land cases and development projects in a timely manner.

c. Administer sales and free use of common variety minerals as needed.

d. Evaluate existing withdrawals in accordance with FLPMA and BLM regulations by 1986.

e. Initiate mineral withdrawals needed to protect National Forest surface resources and areas of high investment (e.g., Administrative Sites, Research Natural Areas (RNAs), developed campgrounds, etc.).

Management Direction

Minerals – Goal #1; MIH Code G01 (page IV-51): Initiate action for withdrawal from entry when other applicable laws and regulations will not provide the capability for protection of the surface resource and uses.

Minerals – Goal #2; MIH Code G02 (page IV-51): Perform mineral evaluations on mineral claims or leases where development activity may cause significant surface disturbance.

Minerals – Goal #3; MIH Codes G03, G04, G05, G06 (page IV-52): Integrate the exploration and development of mineral, common variety, and energy resources with the use and protection of other resource values.

Minerals – Goal #6 (page IV-56): Allow mineral leasing in areas which are not withdrawn from this activity.

Toiyabe National Forest LRMP

Management Goals

Minerals – Goal #1 (page IV-10): Minerals exploration and development will be encouraged while establishing reclamation policies that minimize or shorten the duration of impacts on renewable and nonrenewable surface resources.

Management Direction

Minerals – Direction #1 (page IV-57): Encourage exploration and development of mineral resources and minimizing possible adverse impacts on surface resources.

Minerals – Direction #2 (page IV-57): Require an operations plan on all mineral operations that will cause surface resource disturbance.

Minerals – Direction #4 (page IV-57): Require operating plans which minimize impacts to surface and cultural resources and provide for reclamation of disturbed areas.

Minerals – Direction #5 (page IV-57): Insure conformity with operating plans through regular compliance inspections.

Minerals – Direction #6 (page IV-57): Require reclamation bonds commensurate with the requirements of reclamation plans.

Minerals – Direction #7 (page IV-57): Require reclamation plans to achieve the repair of surface disturbances and to return the area and natural pre-existing conditions as possible.

Minerals – Direction #8 (page IV-57 – IV-58): The following "Access and Reclamation Measures" will be encouraged for mineral exploration Forest-wide and will be emphasized in areas where surface resource values are considered highly sensitive and where the physical character of the land, such as terrain and soil type, permit their use:

a. Close or obliterate access unless identified to become part of the transportation system after mineral activity is complete.

b. Minimize need for road construction through the use of specialized exploration equipment.

c. Develop access to a standard necessary to minimize resource impacts and to facilitate reclamation. Development standards and reclamation criteria will be subject to Forest engineering review when land disturbing activities are proposed in areas identified as having highly sensitive resource values.

d. Where new road and drill pad construction is essential for exploration access, such roads and other disturbed areas will generally be closed and stabilized by revegetation and recontouring where necessary to restore site productivity, to protect or restore visual quality, and to minimize resource conflicts.

e. Identify and save topsoil needed for reclamation prior to disturbance.

Minerals – Direction #9 (page IV-58): Input from county officials and others, as appropriate, will be considered before existing or proposed primary access roads are closed.

Minerals – Direction #15 (page IV-58): Prepare mineral evaluations for proposed withdrawals and land exchanges.

Minerals – Direction #16 (page IV-58): Review and process all lease applications submitted by the BLM in a timely fashion. Specific stipulations are described in Table IV-7 and Appendix B of the LRMP.

Minerals – Direction #17 (page IV-58): Provide counties with an opportunity to review geothermal lease applications to ensure that proper stipulations are included.

Minerals – Direction #21 (page IV-59): The Forest Service will work with industry to continue development of cost effective and environmentally sound reclamation procedures through research and experimentation.

Minerals – Direction #22 (page IV-59): The Forest Service will work with industry to further the development and use of drilling equipment, such as track-mounted drill rigs, that will result in effective exploration methods with the least impact on surface resources.

1.7.2 Consolidated Resource Management Plan for the Bureau of Land Management Carson City Field Office

The National Forest and Public Lands Nevada Enhancement Act of 1988 (Public Law 100-550-October 28, 1988) transferred administration of approximately 662,000 acres of BLM-administered lands to the Forest Service in Nevada in 1989. These lands were to be managed in accordance with plans in effect on the date of enactment until the transfer lands were addressed in plans developed under applicable provisions of law (e.g., Forest and Rangeland Renewable Resources Planning Act of 1974, National Forest Management Act). Public lands

transferred to the National Forest System (such as on the Bridgeport Ranger District) were previously managed by the BLM, Walker Resource Management Plan (RMP) and ROD (BLM 1986). The Walker RMP was incorporated into the Carson City Field Office Consolidated Resource Management Plan. The Consolidated RMP, page MIN-1 states that, "Within the Walker Planning Area, about 11,000 acres of public land are either segregated against mineral entry under the Classification and Multiple Use Act or withdrawn from mineral entry through formal withdrawal processes." The East Walker Scenic Area, covering 4,173 acres on National Forest System and BLM-administered lands, is withdrawn from mineral entry. Figure 1-2 shows the portion of the East Walker Scenic Area that was digitized using the Forest Service-provided plat maps. The information derived from the plat maps only covers 2,980 of the 4,173 acres in the scenic area. This is the best available information at this time; however, the Forest Service will continue to work with BLM to digitize the remaining area.

1.7.3 Memorandum of Understanding Between Forest Service and BLM: Implementation of Section 225 of the Energy Policy Act of 2005 Regarding Geothermal Leasing and Permitting

The purpose of this Memorandum of Understanding (MOU) is to facilitate interagency coordination between the Forest Service and BLM, and establish policies and procedures to implement Section 225 of the Energy Policy Act of 2005, Public Law 109-58. Section 225 requires the coordination of geothermal leasing and permitting on public lands and National Forest System lands between the Secretary of the Interior and Secretary of Agriculture.

This MOU establishes that the Forest Service will take the lead for completing pre-lease NEPA documents and is responsible for providing the official Forest Service consent or non-consent to leasing on National Forest System lands. The Forest Service and BLM will also identify, through the analysis, reasonable and justifiable stipulations needed to protect or minimize impacts on specific resources or land uses.

1.7.4 Programmatic Environmental Impact Statement for Geothermal Leasing Exploration and Development

The 2008 Geothermal PEIS was prepared by the BLM and Forest Service to assess environmental impacts associated with the development and implementation of the geothermal program that would facilitate environmentally responsible utility-scale geothermal energy development in the following Western states: Alaska, Arizona, California, Colorado, Idaho, Montana, New Mexico, Nevada, Oregon, Utah, Washington, and Wyoming. Additionally, the 2008 Geothermal PEIS allocated National Forest System lands as open to be considered for geothermal leasing or closed for geothermal leasing, and adopted stipulations, BMPs, and explained the procedures for geothermal leasing and development (BLM and Forest Service 2008).

Forest Service determinations resulting from the 2008 Geothermal PEIS and ROD include:

- Identifying those National Forest System lands that are legally open or closed to leasing;
- Developed a reasonably foreseeable development scenario (RFDS) that indicates a potential for 12,210, MW of electrical generating capacity from 244 power plants in the 12 western states by 2025, plus additional direct uses of geothermal resources;
- Adopting stipulations, BMPs, and procedures for geothermal leasing and development; and
- Recognized that prior to making a leasing decision on lands in proximity to a National Park System unit, the BLM or other surface management agency must determine if there would be any impacts on thermal or hydrological features within the unit, in accordance with the Geothermal Steam Act Amendments (30 USC Section 1026).

The 2008 Geothermal PEIS noted that designating lands for geothermal leasing potential and amending a land use plan, in and of itself, does not cause any direct impacts as defined by the Council on Environmental Quality (CEQ) regulations (40 CFR 1508.8(a)). However, it is reasonable to foresee that on-the-ground impacts would occur if the BLM were to issue geothermal leases, but that the impacts would not occur until sometime in the future. Therefore, the 2008 Geothermal PEIS addressed both direct and indirect impacts based on the foreseeable on-the-ground actions, including exploration, drilling, and utilization.

These impacts were not analyzed site-specifically, but generically and programmatically analyzed for the 2008 Geothermal PEIS planning area based on the RFDS. The 2008 Geothermal PEIS analyzed the broad impacts associated with allocation of geothermal resources for leasing along with the adoption of stipulations and BMPs on the basis of the assumptions presented in the RFDS to inform assessment of the likely impacts from development following leasing in the planning area. Beyond some general and programmatic discussion of the possible effects, the 2008 Geothermal PEIS did not include evaluations for site-specific issues associated with on-the-ground actions of geothermal exploration, drilling, utilization, or reclamation and abandonment.

Following the release of the 2008 PEIS, the Forest Service made a decision to consent to lease the Darroughs Hot Springs parcel. This parcel is adjacent to the Tonopah Geothermal Decision Area analyzed in this EIS. This decision was documented in a separate ROD signed on August 18, 2009.

The decision resulting from this EIS does not amend any Forest Service land use plans. However, the decisions made in this action may adopt some or all of the 2008 Geothermal ROD decisions including stipulations.

1.8 SCOPE OF ANALYSIS

The 2008 Geothermal PEIS included an analysis of the potential effects of utility-scale geothermal energy development on public lands. That analysis was designed to provide environmental consequences, pursuant to NEPA, to support the decision, which identified lands legally open to leasing. The Geothermal Leasing on the Humboldt-Toiyabe National Forest EIS is a separate process to determine if these lands are administratively open for leasing, describes the RFDS for the planning area, examines the existing environmental setting, and describes the potential direct, indirect, and cumulative impacts that issuing leases and the anticipated future actions following leasing would have on the human and natural environment.

Since the planning and decision area for the Geothermal Leasing on the Humboldt-Toiyabe National Forest EIS is located within the study area covered by the 2008 Geothermal PEIS analysis, this EIS will be able to "tier" to the PEIS. Tiering refers to the coverage of general matters in a broader EIS, such as the 2008 Geothermal PEIS, with subsequent narrower EISs or environmental assessments, such as this one, incorporating by reference the general discussions and concentrating solely on the issues specific to the EIS or environmental assessment subsequently prepared (40 CFR 1508.28). Tiering typically results in a more efficient environmental analysis process for future development proposals. The determination of the necessary level of additional NEPA analysis is made on a case-by-case basis at the time a project is proposed.

This EIS will tier to and incorporate by reference those elements of the 2008 Geothermal PEIS that are appropriate for such use (e.g., resource impact analysis, stipulations, leasing procedures, and BMPs). As the Humboldt-Toiyabe National Forest presents slightly different issues than those addressed in the 2008 Geothermal PEIS, the analysis for this EIS has been refined and may include other, more site-specific protective provisions.

Subsequent site-specific ground-disturbing geothermal exploration or development projects would require further environmental analysis, such as an environmental assessment or an EIS, that could tier to the subject Final EIS and the 2008 Geothermal PEIS. The appropriate level of analysis would be determined by the authorizing officer. The stipulations outlined in **Appendix A**, Geothermal Lease Stipulations, which incorporates stipulations and BMPs outlined in the 2008 Geothermal PEIS, would apply to future actions.

The Renewable Energy Action Team Desert Renewable Energy Projects BMPs and the International Energy Agency Handbook of Best Practices for Geothermal Drilling could be incorporated, as appropriate, into new leases, associated permits and COAs.

1.9 DECISION FRAMEWORK

Based on the analysis within this Final EIS and the accompanying project record the Forest Service responsible official would decide:

1. What lands would be available for leasing through a consent determination and any surface use stipulations that would be included in future leases the BLM may issue, and
2. What lands would not be available for leasing based on a non-consent determination.

The decision resulting from this analysis would not affect any prior decisions on: 1) pending and existing geothermal leases; or 2) lands made available under previous Forest-Level Availability Determination Decisions. This decision would not make any leasing determination decisions on any lands being analyzed under separate environmental analysis at the time of the EIS.

1.10 PUBLIC INVOLVEMENT AND SCOPING

The formal public scoping comment period, as required by NEPA, began on April 15, 2011, with the publication of the Notice of Intent (NOI) in the Federal Register. A scoping document was also mailed to interested parties in April 2011, and the project was listed in the Schedule of Proposed Action beginning in April of 2011.

Public scoping meetings were held on May 11, 2011, in Yerington, Nevada; May 12, 2011, in Sparks, Nevada; and May 16, 2011, in Austin, Nevada. These meetings provided an opportunity for members of the public, local government, Native American tribes, and other interest groups to learn about Geothermal Leasing on the Humboldt-Toiyabe National Forest EIS, to provide input into the development of the Geothermal Leasing on the Humboldt-Toiyabe National Forest EIS, and to voice their concerns related to potential environmental impacts so that they may be addressed in the Geothermal Leasing on the Humboldt-Toiyabe National Forest EIS.

Interested parties were notified of the scoping meetings via the following: NOI published in Federal Register; media outreach, including press release and project Web site (http://www.fs.usda.gov/goto/htnf/geothermal); and a post card mailing to project mailing list, including federal, state, and local agencies, Native American tribes, special interest groups, and landowners.

Results of the public scoping are summarized in Chapter 6, Consultation and Coordination, and discussed in detailed in the scoping report posted on the project Web site.

A Notice of Availability for the Draft EIS was published in the Federal Register on December 30, 2011. A Notice of proposed Action was published in the Reno Gazette Journal announcing the 45 day comment period on the EIS. In

addition, a mailing was sent to interested parties announcing the release of the Draft EIS and inviting public comments.

Results of the public comment period are summarized in Appendix B.

1.11 TRIBAL COORDINATION

The Forest Service consults on a government-to-government basis with Native American tribes. Consultation and coordination efforts with Native American tribal governments have been initiated and are ongoing.

The Humboldt-Toiyabe National Forest District Rangers have consulted with federally recognized tribes in the planning area, including the Ely Shoshone Tribe, Duckwater Shoshone Tribal Council, Yomba Shoshone Tribe, Te-Moak Tribe of Western Shoshone, Battle Mountain Band Council, Fallon Paiute Shoshone Tribe, Winnemucca Indian Colony, Elko Band Council, Yerington Paiute Tribe, Bridgeport Indian Colony, Bishop Paiute, Walker River Paiute, Washoe Tribe of Nevada and California, Mono Lake Tribe, Goshute Tribe, and Benton Paiute Tribe.

The Forest Service sent letters to the above tribes describing the project and requesting consultation. The letters also included invitations to participate in any requested council meetings and take field trips to the decision areas. Four tribes responded with requests for the Forest Service to present the project information at council meetings and on field trips. The Forest Service attended site visits with the tribes. In addition, eight tribes were provided the Class I Cultural Report. Two tribes expressed concerns related to traditional property uses and the desire to not change anything. Results of tribal consultation are outlined in Section 3.18.5.

1.12 ISSUES

The following key issues have been identified based on internal (within the Forest Service), tribal comments, and external (public) scoping comments and will be considered in the analysis. The issues identified were based on the assumption that geothermal exploration and development similar to that discussed in **Section 2.8**, Reasonable Foreseeable Development Scenario, would be undertaken and result in potential impacts.

Wildlife

Issue: Impacts on critical big game winter range, sage-grouse leks, and other wildlife habitats as a result of geothermal leasing decisions. The Forest Service should develop leasing stipulations to lessen any impacts on wildlife and their habitat. Impacts may include:

- disruption of mating, foraging, and other behaviors;

- conflicts with existing conservation plans and recovery goals;
- reduced forage and available water for wildlife; and
- loss or fragmentation of wildlife habitat.

Issue: Impacts on migratory birds and raptors, including eagles, as a result of geothermal leasing decisions. The Forest Service should develop leasing stipulations to lessen any impacts on migratory birds and raptors, and their habitat. Impacts may include:

- disruption of mating, foraging, and other behaviors;
- conflicts with existing conservation plans and recovery goals;
- reduced forage and available water for wildlife; and
- loss or fragmentation of wildlife habitat.

Issue: Impacts on aquatic species and their habitats as a result of geothermal leasing decisions.

Issue: Impacts on threatened, endangered, or sensitive species related to geothermal leasing decisions.

Water Resources

Issue: Impacts on water resources from activities related to geothermal leasing. The Forest Service should develop leasing stipulations to lessen any impacts on ground and surface water resources. Impacts may include:

- impacts on water quantity and quality in the region, including aquifers, hot springs and wells;
- impacts on the critical zone of recharge to the groundwater systems that feed the springs and on which many of the ecosystems of the region depend;
- contamination and depletion of surface water in the region; and
- contamination of water used for ceremonies, irrigation, cooking, drinking, and recreation in the area.

Socioeconomics

Issue: Impacts on the local and regional economy and quality of life. Direct and indirect adverse impacts may include the following:

- loss of recreational opportunities;
- emotional distress to local residents, business owners, and tourists; and
- loss of income to local residents/businesses.

Issue: Beneficial impacts on the local economy and quality of life. Direct and indirect beneficial impacts may include the following:

- increased employment from employment needs;
- positive change in regional employment opportunities;
- increased economic output to the region from leasing activities; and/or
- increased taxes to the region from construction and operation.

Tribal Interests and Native American Concerns

Issue: Potential adverse impacts on Native American resources, including impacts on the following:

- Traditional Cultural Properties;
- archaeological sites;
- traditional practices and beliefs of regional Native Americans;
- tribal traditional use of forest resources; and/or
- lands and resources that are considered sacred by Native Americans in the region.

Air Quality

Issue: Impacts on air quality resources at project sites and within the surrounding area from dust created by drilling, road construction, facility construction and other activities, as well as vehicle, equipment, and facility emissions.

Climate Change

Issue: Potential to contribute to global warming through the carbon footprint associated with the four phases of geothermal development.

Cultural Resources and Historic Trails

Issue: Impacts on cultural resources and historic trails during exploration and development. This includes the potential for the following:

- disturbance and removal of significant and/or National Register of Historic Places-eligible prehistoric and Historic period sites;
- loss of cultural practice opportunities for Native Americans (e.g., traditional plant gathering, traditional sacred places, travel routes);
- loss of scientific data and research potential;
- surface water resources, including hot springs and
- loss of historic viewshed and cultural heritage and values.

Recreation
Issue: Impacts on recreation including the restriction, disturbance, or direct loss of recreational opportunities, values, and safety. Recreational opportunities that may be limited, disturbed, or lost include but are not limited to:

- hiking
- backpacking
- hunting
- fishing
- wildlife viewing
- camping
- bird-watching
- off-highway vehicle use.

This also includes the potential for a loss of spirituality, remoteness, solitude, wilderness, and naturalness in the area.

Visual Resources
Issue: Impacts on visual resources from roads, pipelines, power plants, and transmission lines.

Vegetation
Issue: Impacts on vegetation, including the following:

- effects to sensitive and Threatened and Endangered Species;
- loss of vegetation cover;
- loss of native plants;
- loss of medicinal and culturally significant plants; and/or
- increased potential for establishment and/or expansion of non-native species.

Wild Horses and Burros
Issue: Impacts on wild horses and burros within the planning area. This includes the potential for loss of range, and contamination of food and water sources on which wild horse and burros in the region depend.

Land Use and Access
Issue: Effects on other land uses including grazing, mining and hunting

Inventoried Roadless Areas
Issue: Impacts from leasing or development in Inventoried Roadless Areas

Special Designated Areas

Issue: Impacts on other land uses and special designation areas. Specific concerns included, but were not limited to: State Wildlife Areas, State trust lands, Inventoried Roadless Areas, RNAs, and National Historic and National Scenic Trails.

Other Comments

The following comments were also provided during scoping but did not result in issue statements.

1. Cumulative impacts in relation to past, present, and future renewable energy development in the southern Nevada region, including, but not limited to, the following:

- past mining operations;
- livestock grazing;
- timber harvest;
- road development; and
- exploratory drilling proposals.

Response: cumulative impacts are discussed in Chapter 5 of this EIS.

2. How will the Forest Service meet its obligations under all applicable state, tribal, and federal laws for the proposed and connected actions.

Response: The action is in conformance with all applicable federal, state, and local laws, and the Humboldt and Toiyabe LRMPs.

3. Forest Service plans, guidelines, as well as standards, should be incorporated in the analysis.

Response: The Draft EIS incorporates the applicable Forest Service guidance that would be followed.

4. Potential environmental impacts associated with future activities, such as exploration, development, operation, and decommission.

Response: The RFDS displays the range of impacts associated with geothermal development and is used in the Final EIS to describe potential effects of the proposed action and alternatives.

5. A variety of alternatives should be considered, including a smaller project footprint alternative, no-action alternative, and alternatives that restrict or prohibit development in specific areas as a result of hydrological, biological, cultural, or other resource management objectives that take precedence over mineral development.

Response: The Forest Service has developed a reasonable range of alternatives to display in the Final EIS.

CHAPTER 2
PROPOSED ACTION AND ALTERNATIVES

2.1 INTRODUCTION

This chapter provides the details of the proposed action, alternatives to the proposed action, a discussion of alternatives considered but eliminated from detailed analysis, and an overview of the RFDS for geothermal resources in the Humboldt-Toiyabe National Forest in Nevada.

Following the close of the public scoping period on May 31, 2011, the Forest Service began developing alternatives. Based on the public input, the interdisciplinary team's analysis of the current management situation and resource data, and the defined purpose and need for the project, the Forest Service developed four alternatives, including the No Action Alternative.

Each of the alternatives denotes whether the Forest Service would provide consent to leasing land in each of the geothermal decision areas and which lease stipulations would apply. Differences between alternatives are expressed by whether consent would be provided and the degree of stipulation constraints applied to the areas where consent would be granted.

2.1.1 Identified Lands Available for Geothermal Leasing

The geothermal leasing regulations (43 CFR 3201, Available Lands) describe the types of lands available and unavailable for geothermal leasing. The BLM may issue geothermal leases on National Forest System lands that are allocated for open use in the land use planning process. Exceptions to this are identified as lands closed to geothermal leasing; this denotes an area that is not available for geothermal leasing, exploration, or development for nondiscretionary or discretionary reasons. The 2008 Geothermal PEIS identified certain classifications of lands as excluded from geothermal leasing based on non-discretionary or discretionary basis. Non-discretionary closures include lands that are excluded based on existing laws, regulations (43 CFR 3201.11), and Executive Orders. For both the action and no action alternatives, non-

discretionary closed lands or lands where consent would not be granted for leasing include:

- The East Walker Scenic Area (4,173 acres); and
- The Jack Springs RNA (1,272 acres).

2.2 STIPULATIONS, BEST MANAGEMENT PRACTICES, AND PROCEDURES

This section describes the types of constraints that would be applied as appropriate to any new leases for lands that are available for geothermal leasing. The stipulations, BMPs, and procedures were developed as part of the 2008 Geothermal PEIS and through the assessment process for this EIS. These stipulations were selected for inclusion based on a comprehensive review of LRMPs, program guidance, geothermal development activities, published data on geothermal development impacts, industry standards, and best professional judgment. Other reports on fluid mineral leasing and development (e.g., oil and gas) were consulted because of the similarity of most of the activities and impacts, such as from exploration, drilling, and site development. Where the agency determines that particular stipulations may be inappropriate for a planning area, the procedures for waivers, exceptions, and modifications would be followed.

Lease Stipulations

Lease stipulations are major or moderate constraints applied to a new geothermal lease. A lease stipulation is a condition of lease issuance that provides a level of protection for other resource values or land uses by restricting lease operations during certain times or at certain locations or by mitigating unacceptable impacts, to an extent greater than standard lease terms or conditions. A stipulation is an enforceable term of the lease contract. Lease stipulations implement the Forest Service's regulatory authority to protect resources and resource values.

Leasing would include stipulations from Chapter 2 of the 2008 Geothermal PEIS (BLM and Forest Service 2008) and other stipulations determined to be reasonable and necessary to protect surface resources. The Forest Service authorized officer retains the discretion to issue stipulations that impose moderate to major constraints on use of surface of any leases in order to mitigate the impacts on other land uses or resources objectives as defined by guiding LRMPs.

Lease Exceptions, Waivers and Modifications

To ensure leasing decisions remain appropriate, the Forest Service could apply lease stipulation exception, waiver, and modification criteria. On National Forest System lands, the Forest Service is the authorized officer when granting a request for an exception, modification, or waiver, and the Forest Service appeals procedures would apply. An exception is a one-time exemption for a particular site within the leasehold; exceptions are determined on a case-by-

case basis, and the stipulation continues to apply to all other sites within the leasehold. An exception is a limited type of waiver. A waiver is a permanent exemption from a lease stipulation. The stipulation no longer applies anywhere within the leasehold. A modification is a change to the provisions of a lease stipulation, either temporarily or for the term of the lease. Depending on the specific modification, the stipulation may or may not apply to all sites within the leasehold to which the restrictive criteria are applied.

No Surface Occupancy Lease Stipulations

No Surface Occupancy (NSO) stipulations are considered a major constraint as they do not allow for surface development. NSO stipulations are applied to the standard lease form as condition of the lease. An NSO is appropriate when the standard terms and conditions, other less restrictive lease stipulations, and BMPs for permit approval are determined to be insufficient to achieve the resource protection objectives.

Timing Limitations and Controlled Surface Use Lease Stipulations

Where standard lease terms and permit-level decisions are deemed insufficient to protect sensitive resources but where an NSO is deemed overly restrictive, the Forest Service would apply seasonal or time limited (TL) stipulations or controlled surface use (CSU) stipulations to leases.

In general, timing limitations are used to protect resources that are sensitive to disturbance during certain periods. Such stipulations are generally applicable to specific areas, seasons and resources. They are commonly applied to wildlife activities and habitat, such as winter range for deer, elk, and moose, nesting habitat for raptors and migratory birds, and breeding areas.

A CSU allows the BLM and Forest Service to require that any future activity or development be modified or relocated from the proposed location if necessary to achieve resource protection. The lessee would be required to submit a plan to meet the resource management objectives through special design, construction, operation, mitigation, and reclamation measures, or relocation. CSU is often applied to protect riparian, wetland, and other habitat types.

Best Management Practices

In addition to lease stipulations, during any subsequent exploration, drilling, utilization, or reclamation and abandonment of geothermal resources, the BLM may require project-specific mitigation measures to permits. Best Management Practices (BMPs) would not be adopted for this action or decision. However, BMPs would be incorporated into permit application or may be included in the approved use authorization as COAs. The recommended BMPs detailed in Appendix B of the 2008 Geothermal PEIS would be incorporated as appropriate into the permit application by the lessee or would be included in the approved use authorization by the BLM as COAs. When implementing the BMPs, BLM would work with an affected lessee early in the process to explain how BMPs may fit into their development proposals and how BMPs can be implemented

with the least economic impact on the lessee. The BLM would discuss potential resource impacts with the lessee and seek the operator's recommended solutions. The BLM would also encourage the lessee to incorporate necessary and effective BMPs into their project proposal as determined to be appropriate during site-specific project level environmental analysis. BMPs not incorporated into the permit application by the lessee may be considered and evaluated through the environmental review process and incorporated into the use authorization as COAs or rights-of-way stipulations.

2.2.1 Monitoring

Measures, including lease stipulations and COAs as well as the general operation of geothermal developments, would be monitored by the lessee or the appropriate federal agency to ensure their continued effectiveness through all phases of development. Using adaptive management strategies, where measures are determined to be ineffective at meeting the desired resource conditions, the BLM would take steps to determine the cause and require the operator to take corrective action.

2.2.2 Procedures Prior to Leasing

To ensure compliance with regulations and federal laws, necessary procedures would be implemented prior to any lands being included in a lease sale. Stipulations listed above would also be used to help achieve resource protection in accordance with laws and regulations. Procedures prior to leasing would follow guidance identified in the 2008 Geothermal PEIS (BLM and Forest Service 2008).

The Forest Service would be consulted and provide a consent determination (including terms and conditions or stipulations) to the BLM prior to any parcels on National Forest System lands being offered for lease sale. As a condition of consent to the issuance of any lease, the Forest Service would be consulted on the development of a surface use plan.

To ensure compliance with regulations and federal laws, the procedures detailed in the 2008 Geothermal PEIS (BLM and Forest Service 2008), included in Appendix B of that document, would be implemented prior to any lands being included in a lease sale. Stipulations would also be used to help achieve resource protection in accordance with laws and regulations and the Forest Plans.

2.3 ALTERNATIVE I: PROPOSED ACTION

The Forest Service would consent to lease up to approximately 609,780 acres of National Forest System lands administratively available for geothermal leasing. The lands to be made available for leasing encompass most of the Nevada portion of the Bridgeport Ranger District (approximately 602,115 available acres), one area on the Austin Ranger District (3,961 acres), one area on the Tonopah District (166 acres), and one area on the Ely Ranger District (3,538 acres). Figure 1-1 shows the planning area, subject to modification pending any final land status adjustments. Leasing would include stipulations from Chapter 2

of the 2008 Geothermal PEIS (BLM and Forest Service 2008) and other stipulations determined to be reasonable and necessary to protect surface resources as outlined in Appendix A.

The Bridgeport Geothermal Decision Area encompasses a total of 607,560 acres. Under this alternative, no consent would be provided for lands within the Jacks Spring RNA (1,272 acres) or the East Walker River Scenic Area (4,173 acres). The area of consent would, therefore, encompass 602,115 acres.

The proposed action incorporated decisions from the 2008 Geothermal ROD as well as additional protective stipulations and constraints. Some of these additional protective stipulations/constraints are applied as additional protections for resource areas already identified for at least some protection; other stipulations/constraints are applied to identify areas for which a higher level of protection beyond the standard stipulations is appropriate. The proposed action stipulations are discussed in Appendix A and listed in **Table 2-1**, Proposed Action Geothermal Lease Stipulations.

Table 2-1
Proposed Action Geothermal Lease Stipulations

A. No Surface Occupancy

1. On National Forest System Lands, no surface occupancy or other surface disturbance would be allowed on slopes in excess of 40 percent.
2. The lease may be found to contain historic properties and/or resources protected under the National Historic Preservation Act (NHPA), American Indian Religious Freedom Act, Native American Graves Protection and Repatriation Act, E.O. 13007, or other statutes and executive orders. No ground-disturbing operations would be allowed within 200 feet of eligible National Register sites, historic properties, National Historic Trails, or unevaluated archeological historic sites.
3. Within water bodies, riparian areas, wetlands, playas, and 100-year floodplains, and specifically with a 300-foot buffer for around Lahontan cutthroat trout historic habitat.
4. No surface occupancy would be allowed within a minimum buffer of 200 feet of Traditional Cultural Properties (TCPs) and Native American sacred sites, as identified through consultation.
5. In developed recreational facilities, special-use permit recreation sites (e.g., ski resorts and camps), and areas with significant recreational use with which geothermal development is deemed incompatible; excluding direct use applications.
6. Adjacent to segments of rivers determined to be potentially eligible for Wild and Scenic Rivers (WSR) status by virtue of a WSR inventory, including a corridor of 0.25 miles from the high water mark on either side of the bank.

B. Controlled Surface Use

1. Protection of riparian and wetland habitat would be applied within 500 feet of riparian or wetland vegetation to protect the values and functions of these areas. Measures required would be based on the nature, extent, and value of the area potentially affected.
2. Protection for visual resources would be applied to National Forest System lands with a Visual Quality Objective of Retention and other sensitive viewsheds, such as within the visual setting of National Scenic and Historic Trails or near residential areas.
3. Protection of recreational areas would be applied to minimize the potential for adverse impacts on

Table 2-1
Proposed Action Geothermal Lease Stipulations

recreational values, both motorized and non-motorized, and the natural settings associated with the recreational activity.

4. Ensure compatibility with urban interface would be applied to minimize the potential for adverse impacts on residential areas, schools, or other adjacent urban land uses.
5. The lands within a lease may now or hereafter include plants, animals or their habitat listed as threatened, endangered, proposed, or have candidate status with the US Fish and Wildlife Service. The Forest Service may require modifications to or disapprove proposed activity that is likely to jeopardize the continued existence of a proposed, threatened, endangered, or candidate species or result in the destruction or adverse modification of a designated or proposed critical habitat. The Forest Service would not approve any ground-disturbing activity that may affect any such species or critical habitat until it completes its obligations under applicable requirements of the Endangered Species Act (ESA) as amended, 16 USC 1531 et seq., including completion of any required procedure for conference or consultation.
6. The lands within a lease may now or hereafter include plants, animals or their habitat designated as Forest Service Sensitive or have designation through other agencies such as the Nevada Department of Wildlife. The Forest Service may require modifications to exploration and development proposals or disapprove activities in order to avoid the need to list these species under the ESA.
7. The Forest Service manages approximately 409,200 acres of land in the planning area that is designated as Inventoried Roadless Areas (IRA). No new road construction or road reconstruction may occur within the portion of leases that occur in Inventoried Roadless Areas, unless specifically authorized by the Secretary of Agriculture. Timber may not be cut, sold, or removed from an Inventoried Roadless Area.
8. Operations would be restricted to protect tribal cultural traditions and practices.
9. Operator would be held responsible for damage to cultural resource sites.

C. Timing Limitations

1. In areas identified as having sensitive plant species, ground-disturbing activities would be limited to periods outside of the growing season.
2. Migratory Bird Habitat – No ground disturbing activities would be allowed during nesting season unless a nest survey is completed prior to ground disturbance. A nest survey would be conducted by a qualified biologist within migratory bird breeding habitat prior to any surface disturbance associated with exploration activities during the avian breeding season (February 1 through June 1 for raptors and April 1 through Aug 30 for neotropical migrants, depending on location). If nests are located, or if other evidence of nesting (e.g., mated pairs, territorial defense, carrying of nest material, transporting food) is observed, a protective buffer would be delineated and the entire buffer area avoided to prevent destruction or disturbance to nests until they are no longer active. The start and end dates of the seasonal restriction may be altered based on site-specific information such as elevation and winter weather patterns, which would affect breeding chronology and the presence of the species.

D. Sage-grouse Stipulation

1. Prohibit surface occupancy and surface-disturbing activities within three miles of an active lek. Standard exceptions apply (Section B.2, Nevada Governor's Sage-Grouse Conservation Team 2010). The exceptions may be granted in consultation with Nevada Department of Wildlife (NDOW), depending upon the active status of the lek, location of existing infrastructure, or the geographical relationship of topographical barriers and vegetation to the lek site.

Table 2-1
Proposed Action Geothermal Lease Stipulations

	2. For timing restrictions and additional guidance related to limiting impacts on sage-grouse, follow NDOW energy guidelines (Nevada Governor's Sage-Grouse Conservation Team 2010).
E.	**Contingency Rights Stipulation**
	1. BLM has reviewed existing information and planning resources documents and, except as noted in other attached stipulations, knows of no reason why normal development, subject to the controls of applicable laws and regulations and the lease terms and conditions, cannot proceed on the leased lands. However, specific development activities could not be identified prior to lease issuance since the nature and extent of geothermal resources were not known and specific operations have not been proposed. The lessee is hereby made aware that consistent with 43 CFR 3200.4, all post lease operations would be subject to appropriate environmental review and may be limited or denied only if unmitigatable and significant impacts on other land uses or resources would result.
F.	**Special Stipulation for Native American Consultation**
	1. All proposed exploration and development is subject to the requirement for Native American consultation before the BLM would authorize the activity. Depending on the nature of the proposed lease development and the resource of concern, the time to complete Native American consultation and to conduct any mitigation measures may extend the time for authorization. It may also change the ways in which developments are implemented. New lease applications would require Native American consultation.
G.	**Stipulation for Protection of Geothermal Features**
	1. The BLM would include stipulations to protect any significant thermal features of a National Park System unit that could be adversely affected by geothermal development. These stipulations would be added, if necessary, when the lease or permit is issued, extended, renewed or modified (43 CFR 3201.10[b]).
	2. Any leases that contain thermal features (e.g., springs or surface expressions) would have a stipulation requiring monitoring of the thermal features during any exploration, development, and production of the lease to ensure that there are no impacts on water quality or quantity.

Based on the Humboldt and Toiyabe LRMPs, and current resource data for the decision areas, locations within the areas have been identified as NSO and CSU as shown in **Figures 2-1**, Bridgeport Geothermal Decision Area No Surface Occupancy, through **2-4**, Austin, Ely, Tonopah Geothermal Decision Area Controlled Surface Use. Due to the sensitive nature of sage-grouse lek data, the NSO areas shown for sage-grouse are approximate. Nevada Division of Wildlife (NDOW) requires that the lek data be represented on a map with a precision no greater than the Public Land Survey System township, range, and section (approximately one square-mile) in which they reside. Calculations for NSO acres are, therefore, also approximate and may be greater than the actual area identified through field verification for future phases of geothermal leasing and development. The NSO data also do not include areas for which data is not available or is proprietary. In areas where both CSU and NSO stipulations have been identified, the NSO stipulations would be applied.

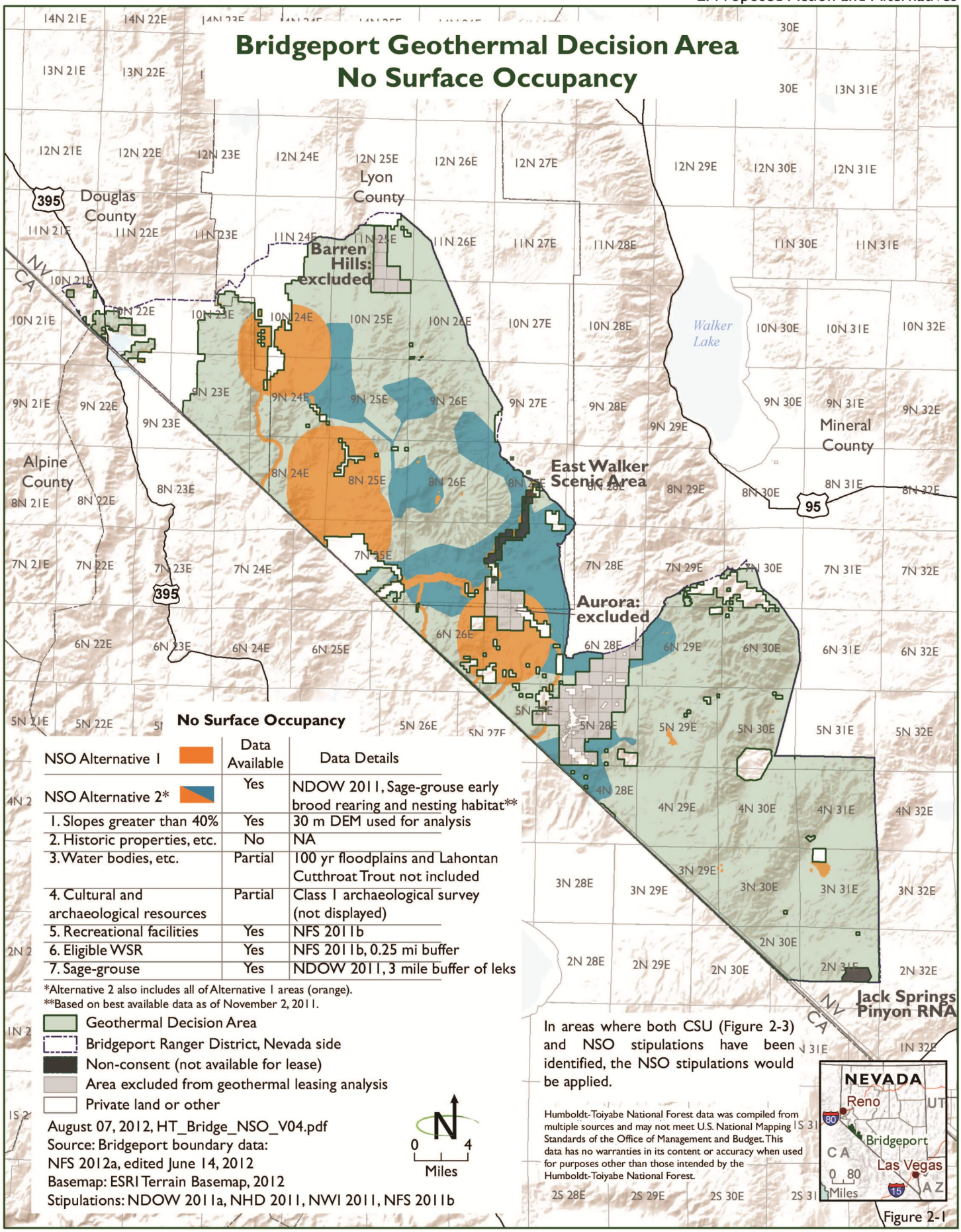
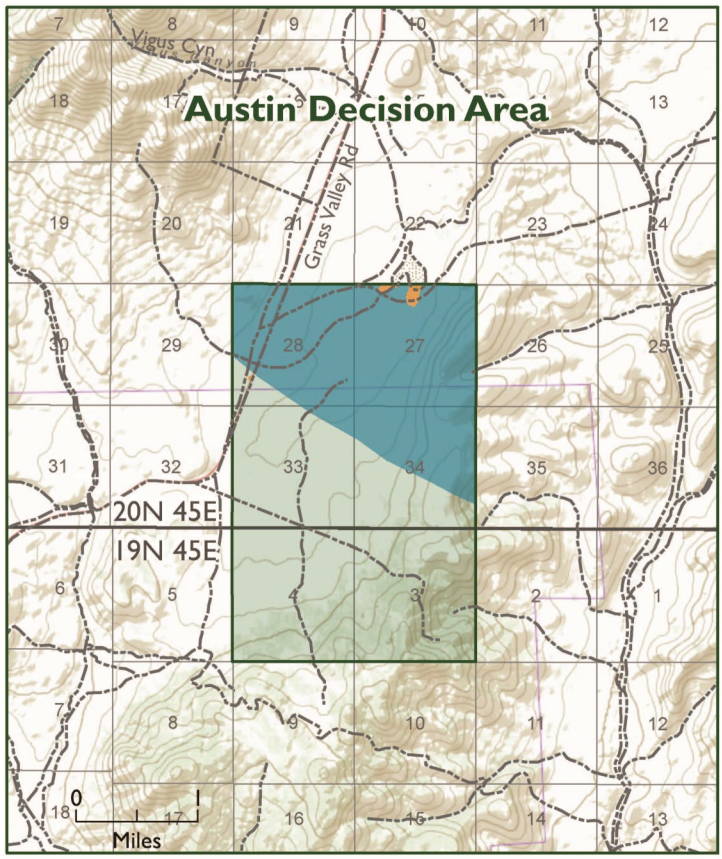
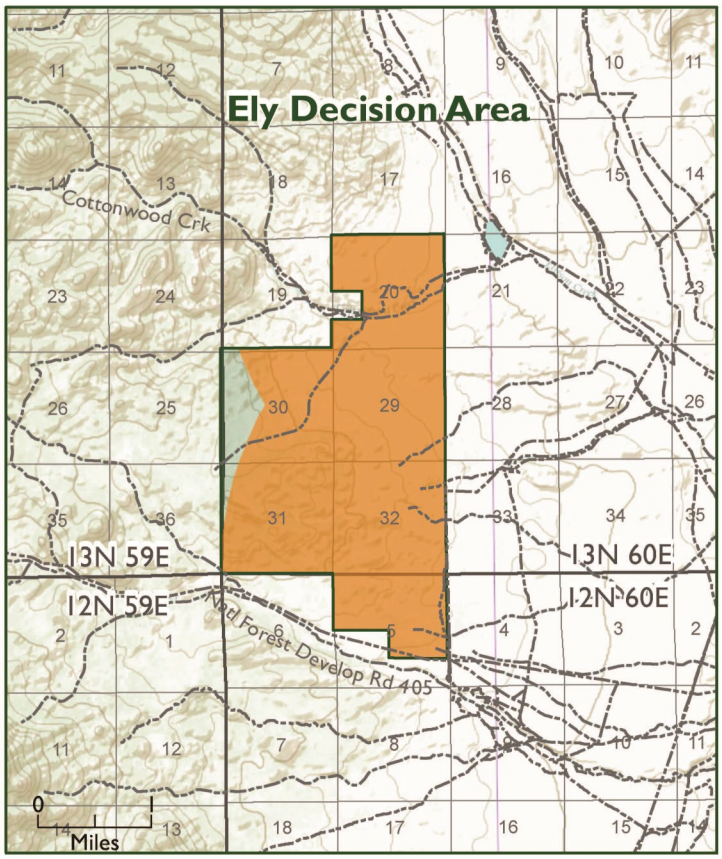
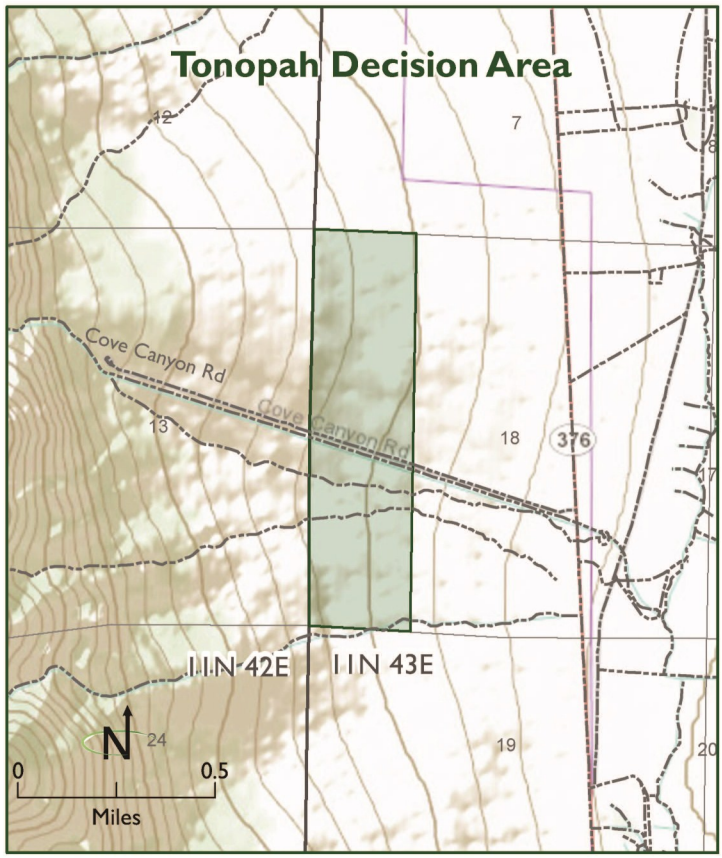

Bridgeport Geothermal Decision Area
No Surface Occupancy
Douglas County
Lyon County
Mineral County
Alpine County
Barren Hills: excluded
East Walker Scenic Area
Aurora: excluded
Walker Lake
Jack Springs Pinyon RNA
NV
CA
395
95
No Surface Occupancy
NSO Alternative 1
NSO Alternative 2*
1. Slopes greater than 40%
2. Historic properties, etc.
3. Water bodies, etc.
4. Cultural and archaeological resources
5. Recreational facilities
6. Eligible WSR
7. Sage-grouse
Data Available
Data Details
Yes
NDOW 2011, Sage-grouse early brood rearing and nesting habitat**
Yes
30 m DEM used for analysis
No
NA
Partial
100 yr floodplains and Lahontan Cutthroat Trout not included
Partial
Class I archaeological survey (not displayed)
Yes
NFS 2011b
Yes
NFS 2011b, 0.25 mi buffer
Yes
NDOW 2011, 3 mile buffer of leks
*Alternative 2 also includes all of Alternative 1 areas (orange).
**Based on best available data as of November 2, 2011.
Geothermal Decision Area
Bridgeport Ranger District, Nevada side
Non-consent (not available for lease)
Area excluded from geothermal leasing analysis
Private land or other
August 07, 2012, HT_Bridge_NSO_V04.pdf
Source: Bridgeport boundary data:
NFS 2012a, edited June 14, 2012
Basemap: ESRI Terrain Basemap, 2012
Stipulations: NDOW 2011a, NHD 2011, NWI 2011, NFS 2011b
N
0 4
Miles
In areas where both CSU (Figure 2-3) and NSO stipulations have been identified, the NSO stipulations would be applied.
Humboldt-Toiyabe National Forest data was compiled from multiple sources and may not meet U.S. National Mapping Standards of the Office of Management and Budget. This data has no warranties in its content or accuracy when used for purposes other than those intended by the Humboldt-Toiyabe National Forest.
NEVADA
Reno
Bridgeport
Las Vegas
CA
UT
AZ
0 80
Miles

Figure 2-1

Austin, Ely, Tonopah Geothermal Decision Areas
No Surface Occupancy







No Surface Occupancy

	Data Available	Data Details
NSO Alternative 1		
NSO Alternative 2*	Yes	NDOW 2011, Sage-grouse early brood rearing and nesting habitat**
1. Slopes greater than 40%	Yes	30M DEM used for analysis
2. Historic properties, etc.	No	NA
3. Water bodies, etc.	Partial	100 yr floodplains and Lahontan Cutthroat Trout not included
4. Cultural and archaeological resources	Partial	Class 1 archaeological survey (not displayed)
5. Recreational facilities	Yes	NFS 2011b
6. Eligible WSR	Yes	NFS 2011b, 0.25 mi buffer
7. Sage-grouse	Yes	NDOW 2011, 3 mile buffer of leks

*Alternative 2 also includes all of Alternative 1 areas (orange).
**Based on best available data as of November 2, 2011.

Geothermal Decision Area

In areas where both CSU (Figure 2-4) and NSO stipulations have been identified, the NSO stipulations would be applied.

August 07, 2012, HT_AET_NSO_V04.pdf
Source - Austin, Ely, and Tonopah boundary data: NFS 2012a, edited June 14, 2012
Basemap: ESRI Terrain Basemap 2012
Stipulations: NDOW 2011a, NFS 2011b, NFS 2011c, NHD 2011, NNHP 2010, NWI 2011

Humboldt-Toiyabe National Forest data was compiled from multiple sources and may not meet U.S. National Mapping Standards of the Office of Management and Budget. This data has no warranties in its content or accuracy when used for purposes other than those intended by the Humboldt-Toiyabe National Forest.

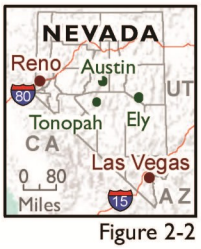


Figure 2-2

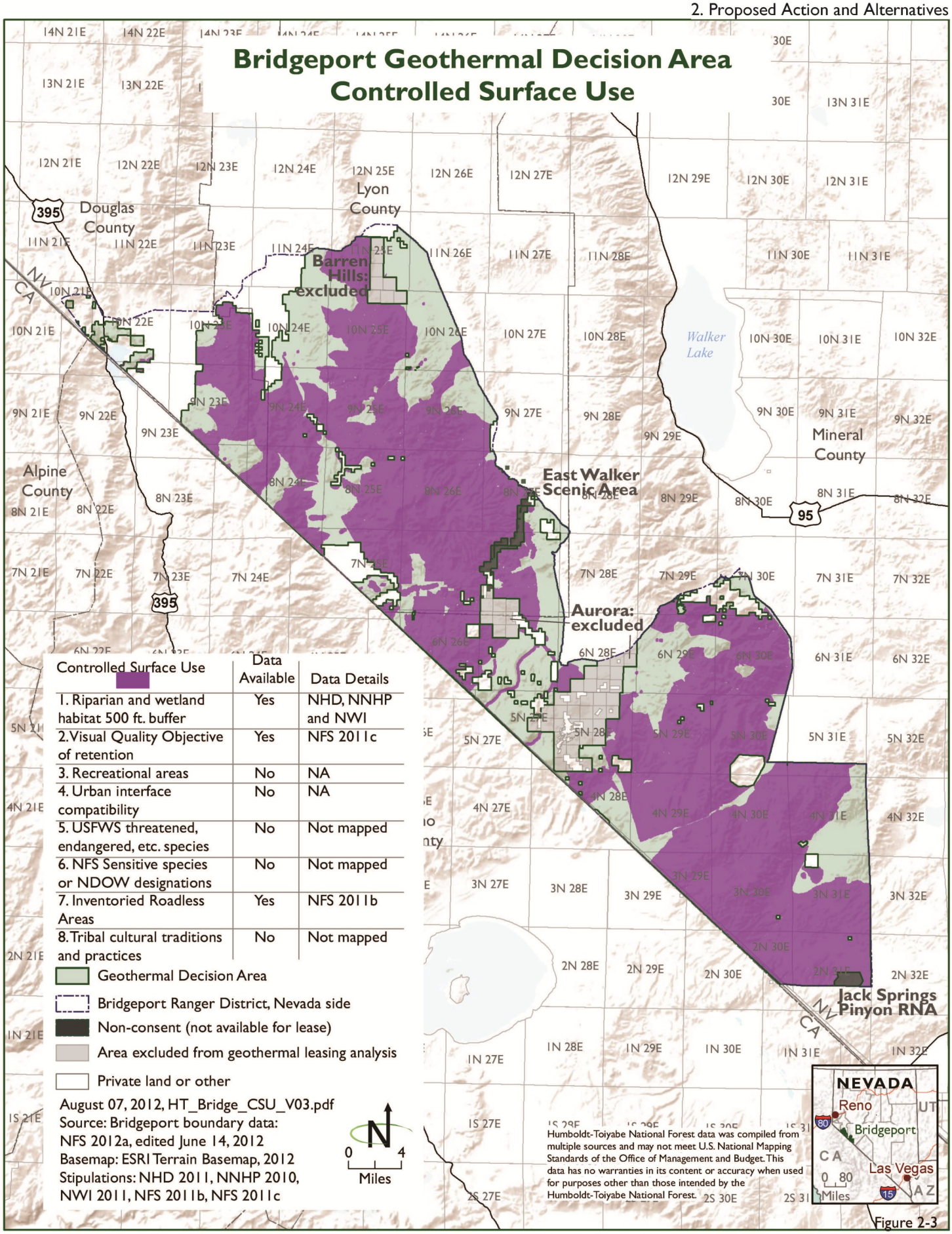
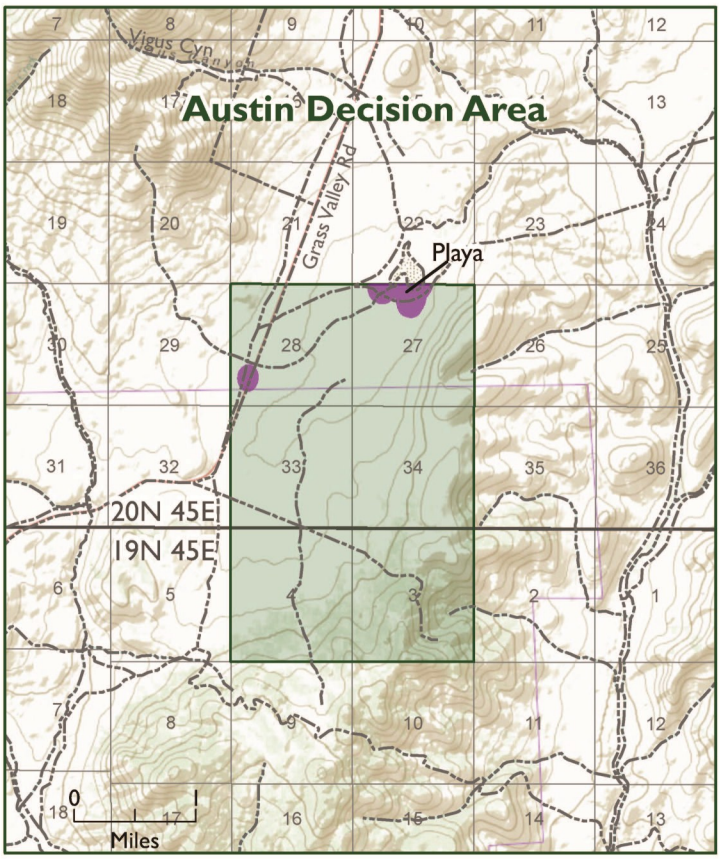
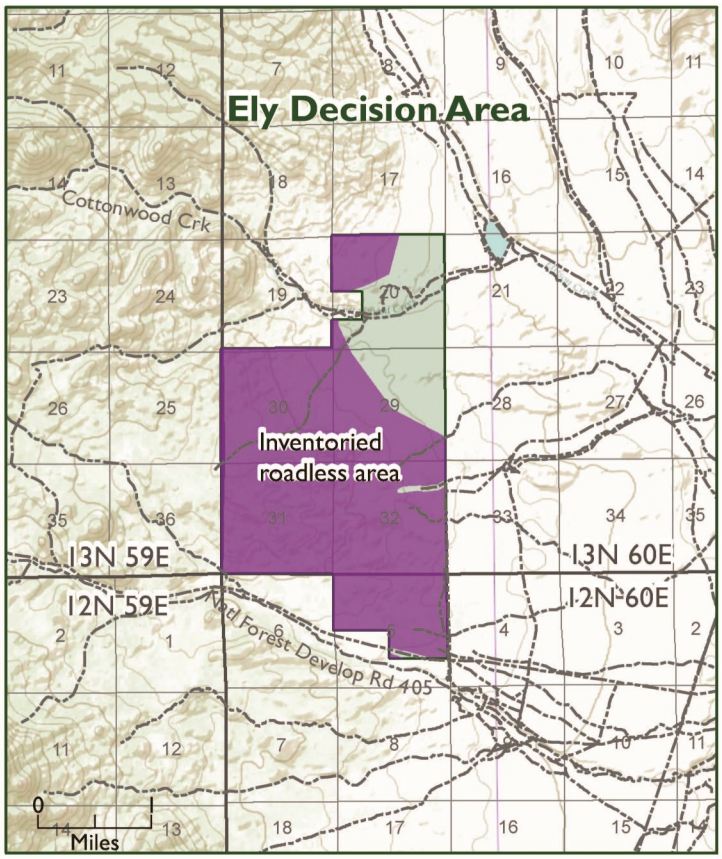
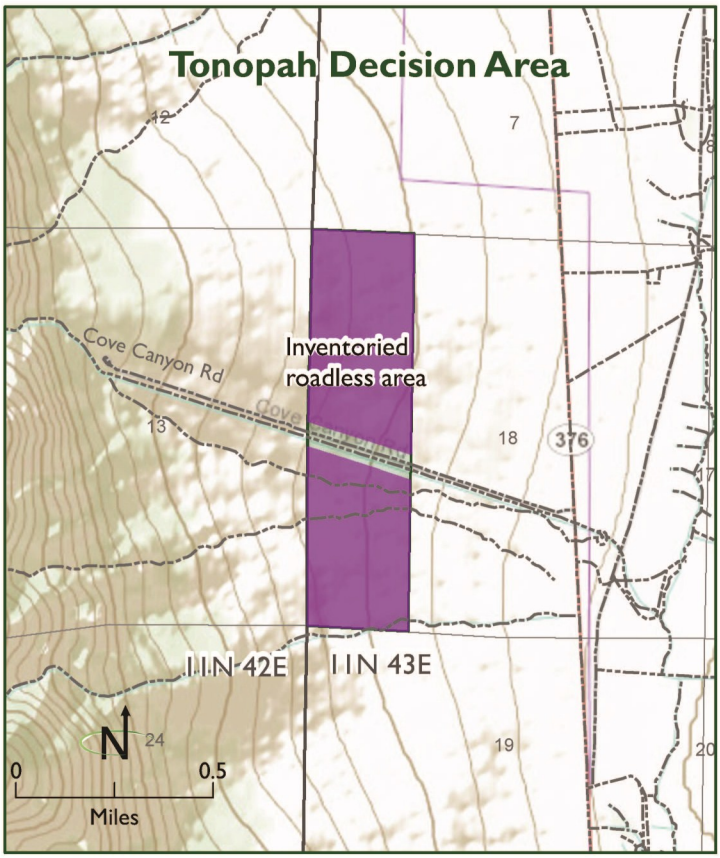

Bridgeport Geothermal Decision Area
Controlled Surface Use
Douglas County
Lyon County
Mineral County
Alpine County
Barren Hills: excluded
East Walker Scenic Area
Aurora: excluded
Jack Springs Pinyon RNA
Walker Lake
NV
CA
395
95
Controlled Surface Use
Data Available
Data Details
1. Riparian and wetland habitat 500 ft. buffer | Yes | NHD, NNHP and NWI
2. Visual Quality Objective of retention | Yes | NFS 2011c
3. Recreational areas | No | NA
4. Urban interface compatibility | No | NA
5. USFWS threatened, endangered, etc. species | No | Not mapped
6. NFS Sensitive species or NDOW designations | No | Not mapped
7. Inventoried Roadless Areas | Yes | NFS 2011b
8. Tribal cultural traditions and practices | No | Not mapped
Geothermal Decision Area
Bridgeport Ranger District, Nevada side
Non-consent (not available for lease)
Area excluded from geothermal leasing analysis
Private land or other
August 07, 2012, HT_Bridge_CSU_V03.pdf
Source: Bridgeport boundary data: NFS 2012a, edited June 14, 2012
Basemap: ESRI Terrain Basemap, 2012
Stipulations: NHD 2011, NNHP 2010, NWI 2011, NFS 2011b, NFS 2011c
N
0 4
Miles
Humboldt-Toiyabe National Forest data was compiled from multiple sources and may not meet U.S. National Mapping Standards of the Office of Management and Budget. This data has no warranties in its content or accuracy when used for purposes other than those intended by the Humboldt-Toiyabe National Forest.
NEVADA
Reno
Bridgeport
Las Vegas
CA
UT
AZ
0 80
Miles

Figure 2-3

Austin, Ely, Tonopah Geothermal Decision Areas
Controlled Surface Use







Controlled Surface Use	Data Available	Data Details
1. Riparian and wetland habitat 500 ft. buffer	Yes	NHD, NNHP and NWI
2. Visual Quality Objective of retention	Yes	NFS 2011c
3. Recreational areas	No	No
4. Urban interface compatibility	No	No
5. USFWS threatened, endangered, etc. species	No	Not mapped
6. NFS Sensitive species or NDOW designations	No	Not mapped
7. Inventoried Roadless Areas	Yes	NFS 2011b
8. Tribal cultural traditions and practices	No	Not mapped

Geothermal Decision Area

August 07, 2012, HT_AET_CSU_V03.pdf
Source - Austin, Ely, and Tonopah boundary data: NFS 2012a, edited June 14, 2012
Basemap: ESRI Terrain Basemap 2012
Stipulations: NHD 2011, NNHP 2010, NWI 2011, NFS 2011b, NFS 2011c

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Figure 2-4

This alternative meets the purpose and need by consenting to lease up to approximately 609,780 acres of National Forest System lands. **Table 2-2**, Stipulations Applied to Address Significant Issues, outlines how the issues were addressed for this alternative.

Table 2-2
Stipulations Applied to Address Significant Issues

Issue	Alternative 1	Alternative 2	Alternative 3[1]	Alternative 4
Wildlife	Stipulations B.5, B.6, C.1, D.1, and D.2 applied to this alternative	Additional Stipulations applied to provide greater protection for the greater sage-grouse. See page Section 2.4.	No Stipulations developed for this issue	Additional Stipulations applied to provide greater protection for the greater sage-grouse. See Section 2.6.
Water Resources	Stipulations A.3, A.6, B.1 and G.2 applied to this alternative	Stipulations A.3, A.6, B.1 and G.2 applied to this alternative	No Stipulations developed for this issue	Stipulations A.3, A.6, B.1 and G.2 applied to this alternative
Socioeconomics	No Stipulations developed for this issue	No Stipulations developed for this issue	No Stipulations developed for this issue	No Stipulations developed for this issue
Tribal interests and Native American concerns	Stipulations A.2, A.4, B.8, B.9 and Stipulation F.1 applied to this alternative	Additional Stipulations applied to provide greater protection for Tribal interests and Native American concerns. See page 2-10 of THE FINAL EIS.	No Stipulations developed for this issue	Stipulations A.2, A.4, B.8, B.9 and Stipulation F.1 applied to this alternative
Air Quality	No Stipulations developed for this issue	No Stipulations developed for this issue	No Stipulations developed for this issue	No Stipulations developed for this issue
Climate Change	No Stipulations developed for this issue	No Stipulations developed for this issue	No Stipulations developed for this issue	No Stipulations developed for this issue
Cultural Resources and Historic Trails	Stipulations B.8, B.9, C.2, D.1, and D.2 applied to this alternative	Stipulations B.8, B.9, C.2, D.1, and D.2 applied to this alternative	No Stipulations developed for this issue	Stipulations B.8, B.9, C.2, D.1, and D.2 applied to this alternative
Recreation	Stipulations A.5, A.6, B.3, and B.7, applied to this alternative.	Stipulations A.5, A.6, B.3, and B.7, applied to this alternative	No Stipulations developed for this issue	Stipulations A.5, A.6, B.3, and B.7, applied to this alternative
Visual Resources	B.2 applied to this alternative	B.2 applied to this alternative	No Stipulations developed for this issue	B.2 applied to this alternative
Vegetation	Stipulations A.5, A.6, B.3, and B.7, applied to this alternative.	Stipulations A.5, A.6, B.3, and B.7, applied to this alternative.	No Stipulations developed for this issue	Stipulations A.5, A.6, B.3, and B.7, applied to this alternative.

Table 2-2
Stipulations Applied to Address Significant Issues

Issue	Alternative 1	Alternative 2	Alternative 3[1]	Alternative 4
Wild Horses and Burros	No Stipulations developed for this issue	No Stipulations developed for this issue	No Stipulations developed for this issue	No Stipulations developed for this issue
Land Use and Access	Stipulations A.5 and B.4 applied.	Stipulations A.5 and B.4 applied.	No Stipulations developed for this issue	Stipulations A.5 and B.4 applied.
Inventoried Roadless Areas	Stipulation B.7 applied	Stipulations B.7 applied	No Stipulations developed for this issue	Stipulations B.7 applied
Special Designated Areas	Stipulations A.6 and B.7 would be applied. Jacks Spring Research Natural area would not be open to leasing.	Stipulations A.6 and B.7 would be applied. Jacks Spring Research Natural area would not be open to leasing.	No Stipulations developed for this issue	Stipulations A.6 and B.7 would be applied. Jacks Spring Research Natural area would not be open to leasing.

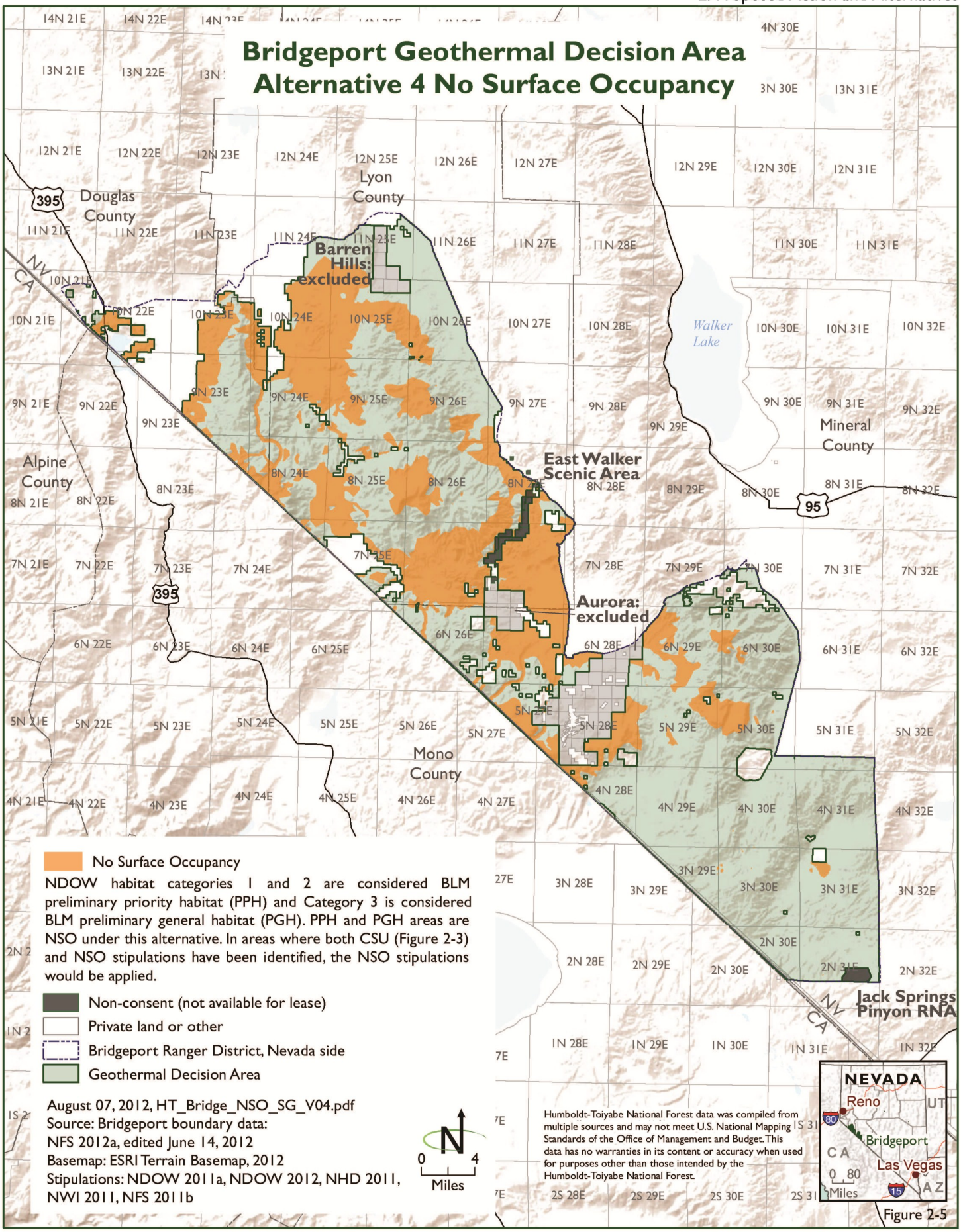
2.4 ALTERNATIVE 2: PROPOSED ACTION WITH ENHANCED STIPULATIONS FOR SAGE-GROUSE, AND TRADITIONAL CULTURAL PROPERTIES (TCPS) AND SACRED SITES

Alternative 2 would be similar to Alternative 1 (Proposed Action) and would analyze the same decision areas for consent to lease; however, this alternative includes additional protection measures for sage-grouse and Native American concerns.

Under this alternative, leasing would include stipulations from Chapter 2 of the 2008 Geothermal PEIS (BLM and Forest Service 2008) and other stipulations determined to be reasonable and necessary to protect surface resources as outlined in in Table 2-1 and Appendix A. The following stipulations would be implemented and would replace the sage-grouse stipulation outlined in Table 2-1 and Appendix A. **Figures 2-5**, Bridgeport Geothermal Decision Area No Surface Occupancy, and **2-6**, Austin, Ely, Tonopah Geothermal Decision Areas No Surface Occupancy , show the decision areas mapped to incorporate the sage-grouse stipulation.

Sage-Grouse Stipulation

Prohibit surface occupancy and surface-disturbing activities within three miles of an active lek. Additionally, prohibit surface occupancy and surface-disturbing activities within field verified active sage-grouse nesting and active early brood-rearing habitat, if it falls outside the three-mile radius from a lek. Standard exceptions apply (Section B.2, Nevada Governor's Sage-Grouse Conservation Team 2010). The exceptions may be granted in consultation with NDOW, depending upon the active status of the lek, location of existing infrastructure, or the geographical relationship of topographical barriers and vegetation to the lek site.


Bridgeport Geothermal Decision Area
Alternative 4 No Surface Occupancy
Douglas County
Lyon County
Mineral County
Alpine County
Mono County
Barren Hills: excluded
East Walker Scenic Area
Aurora: excluded
Walker Lake
Jack Springs Pinyon RNA
NV
CA
395
95
No Surface Occupancy
NDOW habitat categories 1 and 2 are considered BLM preliminary priority habitat (PPH) and Category 3 is considered BLM preliminary general habitat (PGH). PPH and PGH areas are NSO under this alternative. In areas where both CSU (Figure 2-3) and NSO stipulations have been identified, the NSO stipulations would be applied.
Non-consent (not available for lease)
Private land or other
Bridgeport Ranger District, Nevada side
Geothermal Decision Area
August 07, 2012, HT_Bridge_NSO_SG_V04.pdf
Source: Bridgeport boundary data:
NFS 2012a, edited June 14, 2012
Basemap: ESRI Terrain Basemap, 2012
Stipulations: NDOW 2011a, NDOW 2012, NHD 2011, NWI 2011, NFS 2011b
N
0 4
Miles
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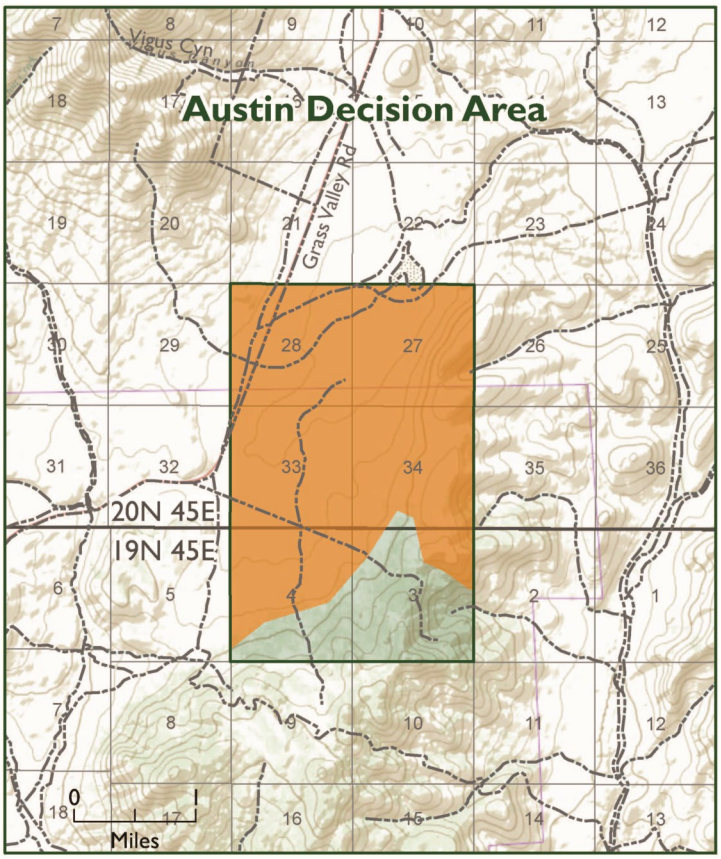
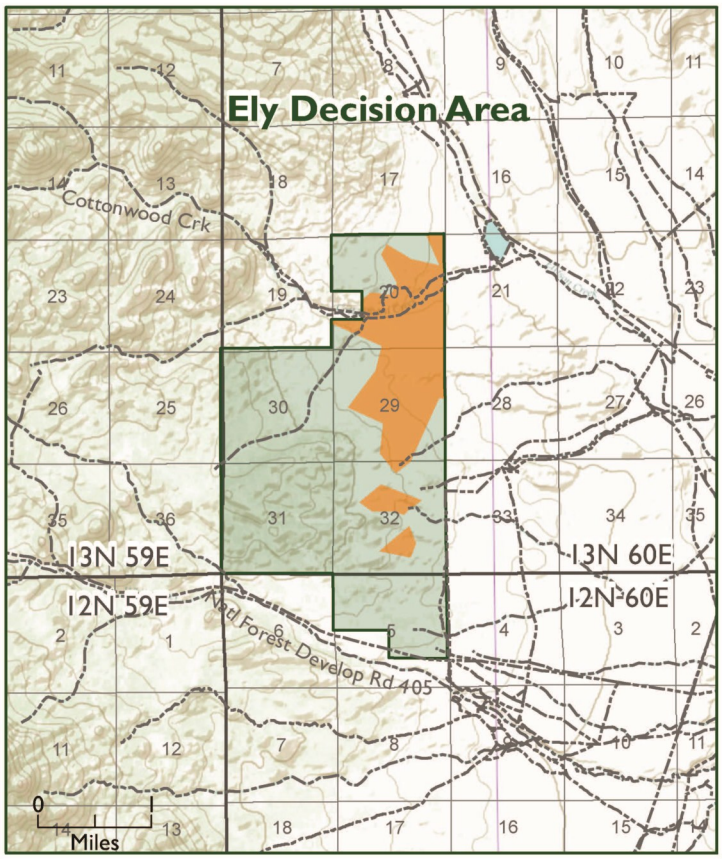
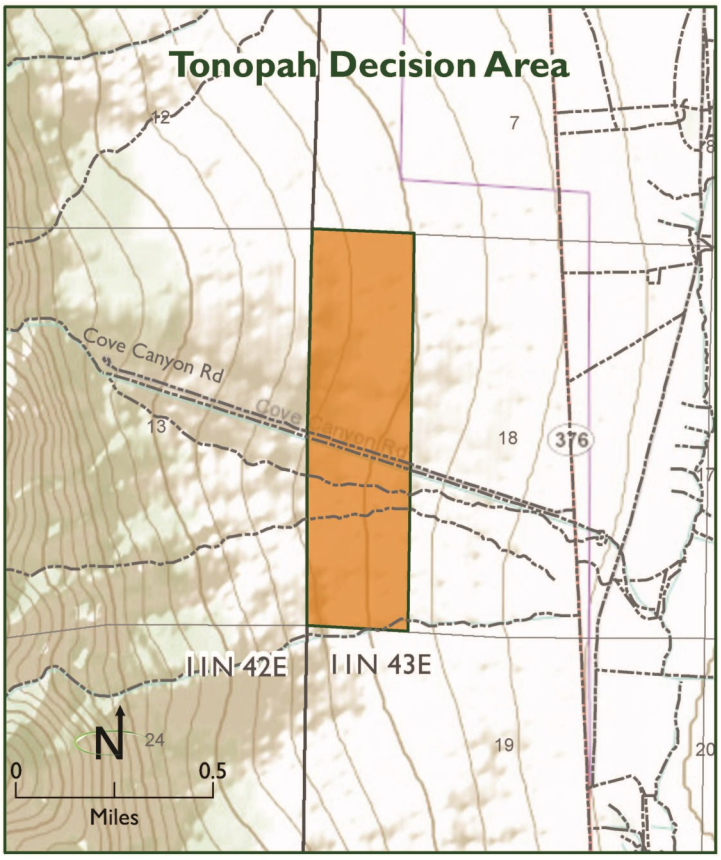
NEVADA
Reno
Bridgeport
Las Vegas
CA
UT
AZ
0 80
Miles

Figure 2-5

Austin, Ely, Tonopah Geothermal Decision Areas
Alternative 4 No Surface Occupancy







NDOW habitat categories 1 and 2 are considered BLM preliminary priority habitat (PPH) and Category 3 is considered BLM preliminary general habitat (PGH). PPH and PGH areas are NSO under this alternative. In areas where both CSU (Figure 2-4) and NSO stipulations have been identified, the NSO stipulations would be applied.

No Surface Occupancy Alternative 4

Geothermal Decision Area

August 07, 2012, HT_AET_NSO_SG_V04.pdf
Source - Austin, Ely, and Tonopah boundary data: NFS 2012a, edited June 14, 2012
Basemap: ESRI Terrain Basemap 2012
Stipulations: NDOW 2011a, NDOW 2012, NFS 2011b, NFS 2011c, NHD 2011, NNHP 2010, NWI 2011

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Figure 2-6

For timing restrictions and additional guidance related to limiting impacts on sage-grouse, follow NDOW energy guidelines (Nevada Governor's Sage-Grouse Conservation Team 2010).

Stipulation for Native American Sacred Sites and Traditional Cultural Properties (TCPs)

No surface occupancy would be allowed within one mile of traditional cultural properties (TCPs) and Native American sacred sites, as identified through consultation.

This alternative meets the purpose and need by consenting to lease up to approximately 609,780 acres of National Forest System lands. Table 2-2 outlines how the issues were addressed for this alternative.

2.5 ALTERNATIVE 3: NO ACTION ALTERNATIVE

NEPA regulations require an agency conducting an EIS to "include the alternative of no action" (40 CFR Part 1502.14). The "No Action" alternative means continuing with the present course of management based on the current Forest Plans.

Alternative 3 is the No Action Alternative. The No Action Alternative would not make an availability determination on lands within the planning area. Processing of geothermal lease applications and nominations would continue; however, they would be evaluated on a case-by-case basis under separate NEPA analyses. This alternative does not meet the purpose and need.

2.6 ALTERNATIVE 4 (PREFERRED ALTERNATIVE): PROPOSED ACTION WITH UPDATED SAGE-GROUSE MANAGEMENT

Alternative 4 would be similar to Alternative 1(Proposed Action) and would analyze the same decision areas for consent to lease. The stipulations under this alternative would be the same as under Alternative 1 except for the sage-grouse stipulations. This alternative includes updated habitat classification and protection measures for sage-grouse.

In March 2012, NDOW released their broad-scale habitat category maps for greater sage-grouse (http://www.ndow.org/wild/conservation/sg/index.shtm). The NDOW habitat category map identifies the following five categories:

1. Essential/Irreplaceable Habitat
2. Important Habitat
3. Habitat of Moderate Importance
4. Low Value Habitat and Transitional Range
5. Unsuitable Habitat

Full definitions for these categories can be found in the Greater Sage-grouse Habitat Categorization White Paper published by NDOW in March 2012 (NDOW 2012).

Until the greater sage-grouse standards and guidelines in both of these LRMPs are revised through Forest Plan amendments, the following standard would apply.

Sage-Grouse Stipulation
Lands categorized as 1 and 2 (preliminary priority habitat) and 3 (preliminary general habitat) would be NSO. Figures 2-5 and 2-6 show the decision areas mapped to incorporate the sage-grouse stipulation. **Figures 2-7** Bridgeport Geothermal Decision Area Sage-Grouse Categories, and **2-8**, Austin, Ely, Tonopah Geothermal Decision Areas Sage-Grouse Categories, show the sage-grouse categories within each of the decision areas. Stipulations under this alternative would apply to greater sage-grouse and the greater sage-grouse bi-state distinct population segment.

Pre-construction field surveys would be conducted after a lease is issued. There may be, as a result of a site-specific proposal and NEPA, a decision to deny or relocate part of a proposal, in the form of a condition of approval for areas identified as preliminary priority habitat or preliminary general habitat. Conditions of approval could also be applied to other areas that are identified as critical to the life process for sage-grouse (e.g., movement corridors).

Finally, lands that are leased would be subject to further NEPA analysis prior to exploration or development to establish whether the lessee would be required to implement measures to minimize impacts (e.g., noise and dust) to greater sage-grouse and their habitat on leased lands.

This alternative meets the purpose and need by consenting to lease up to approximately 609,780 acres of National Forest System lands. Table 2-2 outlines how the issues were addressed for this alternative.

2.7 ALTERNATIVES CONSIDERED BUT ELIMINATED FROM FURTHER CONSIDERATION

2.7.1 No Leasing or Development of Geothermal Resources on National Forest System Lands

Under the No Leasing Alternative, the Forest Service would not consent to leasing of any geothermal resources on National Forest System lands within the planning area. Under this alternative, all future geothermal lease applications and nominations would not be approved so as to preclude any and all environmental consequences. This alternative was considered but eliminated from detailed analysis because it violates the multiple-use provisions of FLPMA and is inconsistent with the President's National Energy Policy, the Energy Policy Act of 2005, and Executive Order 13212. Consequently, the No Lease Alternative was not carried forward for detailed analysis.

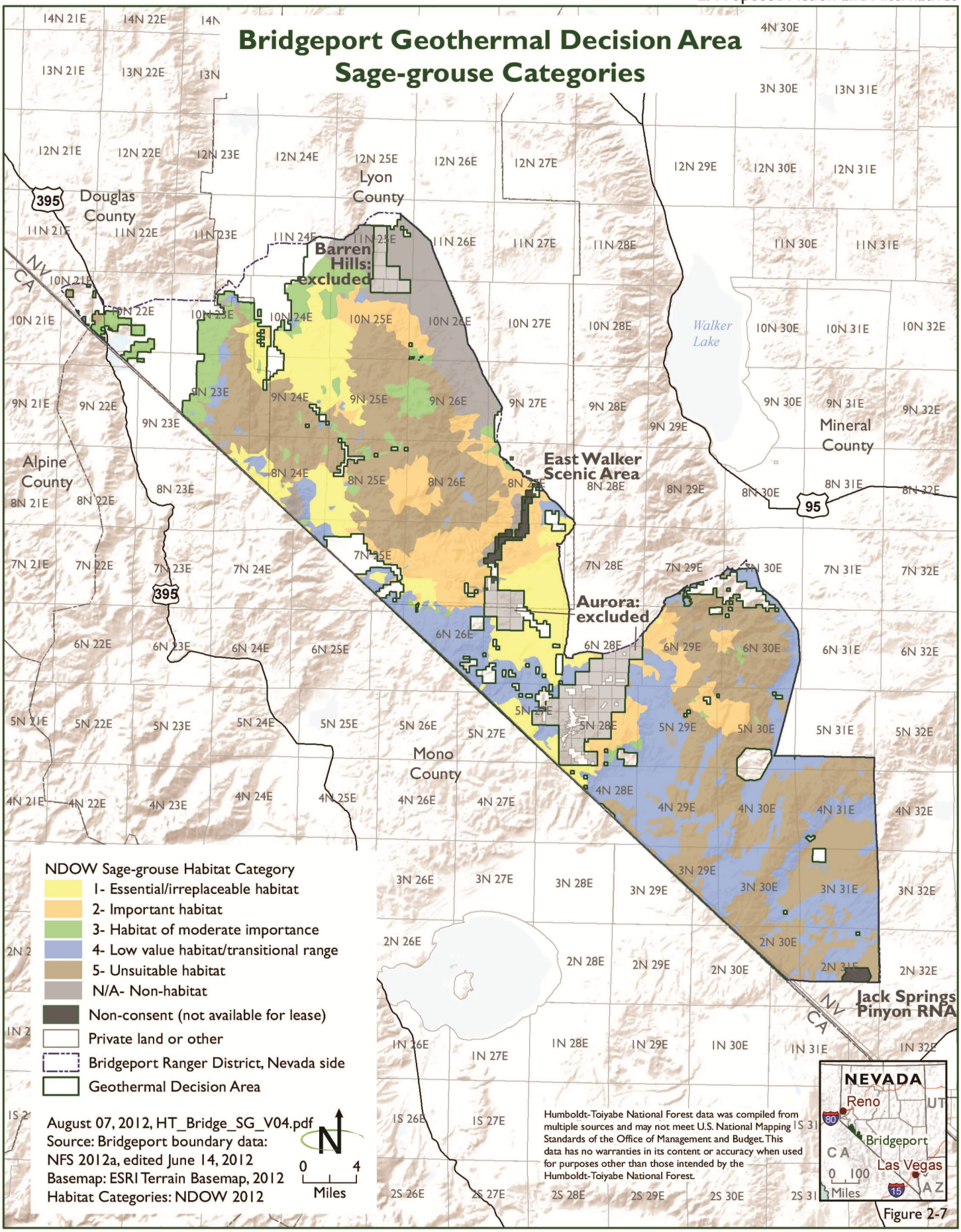
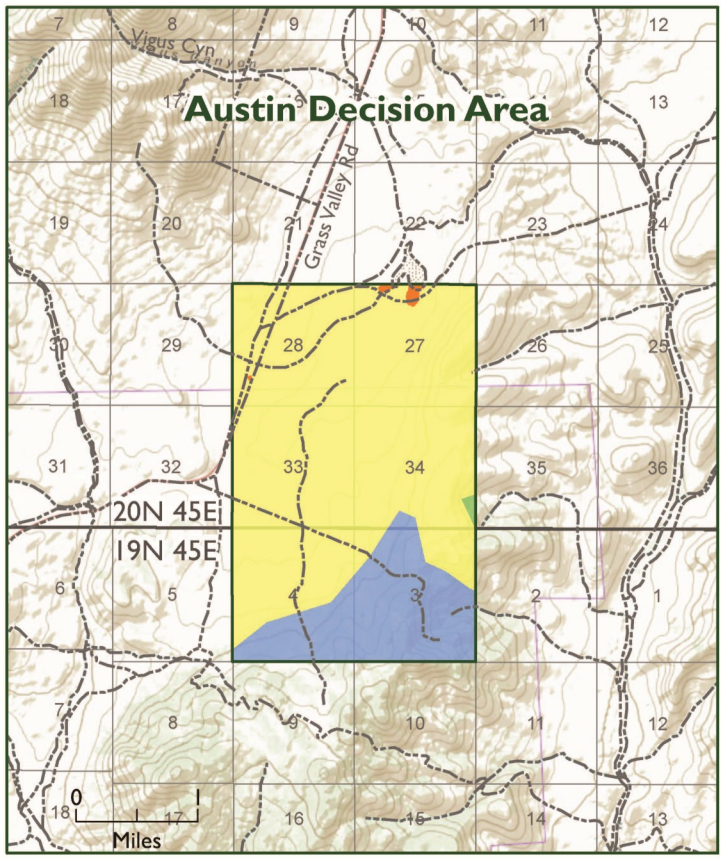
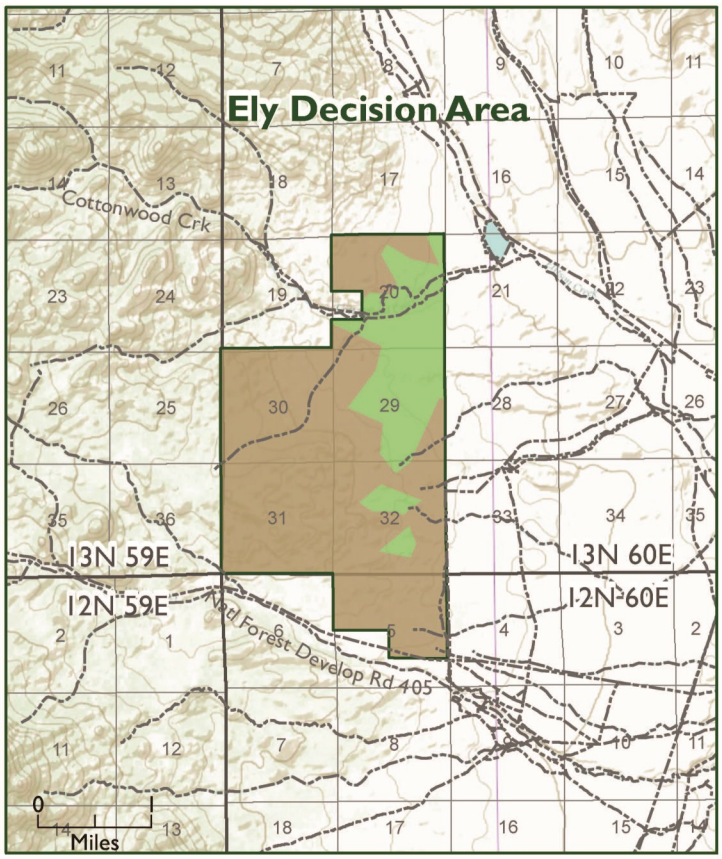
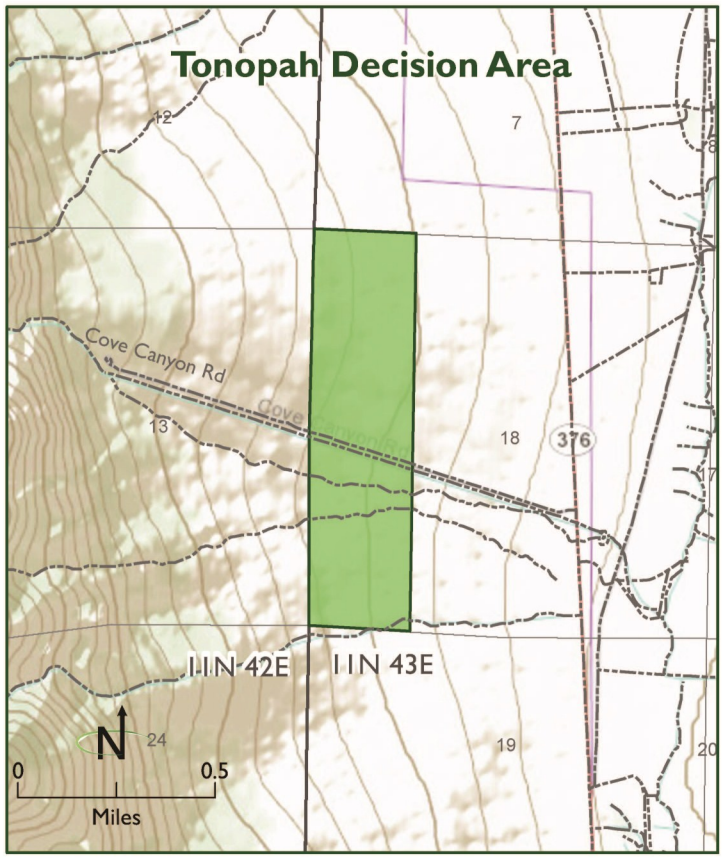

Bridgeport Geothermal Decision Area
Sage-grouse Categories
Douglas County
Lyon County
Barren Hills: excluded
Alpine County
East Walker Scenic Area
Aurora: excluded
Mineral County
Mono County
Walker Lake
Jack Springs Pinyon RNA
NDOW Sage-grouse Habitat Category
1- Essential/irreplaceable habitat
2- Important habitat
3- Habitat of moderate importance
4- Low value habitat/transitional range
5- Unsuitable habitat
N/A- Non-habitat
Non-consent (not available for lease)
Private land or other
Bridgeport Ranger District, Nevada side
Geothermal Decision Area
August 07, 2012, HT_Bridge_SG_V04.pdf
Source: Bridgeport boundary data: NFS 2012a, edited June 14, 2012
Basemap: ESRI Terrain Basemap, 2012
Habitat Categories: NDOW 2012
0 4 Miles
Humboldt-Toiyabe National Forest data was compiled from multiple sources and may not meet U.S. National Mapping Standards of the Office of Management and Budget. This data has no warranties in its content or accuracy when used for purposes other than those intended by the Humboldt-Toiyabe National Forest.
NEVADA
Reno
Bridgeport
Las Vegas
CA
UT
AZ
0 100 Miles

Figure 2-7

Austin, Ely, Tonopah Geothermal Decision Areas
Sage-grouse Categories







NDOW Sage-grouse Habitat Category
- 1- Essential/irreplaceable habitat
- 2- Important habitat
- 3- Habitat of moderate importance
- 4- Low value habitat/transitional range
- 5- Unsuitable habitat
- N/A- Non-habitat
- Geothermal Decision Area

August 07, 2012, HT_AET_SG_V04.pdf
Source - Austin, Ely, and Tonopah boundary data: NFS 2012a, edited June 14, 2012
Basemap: ESRI Terrain Basemap 2012
Stipulations: NDOW 2011a, NDOW 2012, NFS 2011b, NFS 2011c, NHD 2011, NNHP 2010, NWI 2011

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Figure 2-8

2.7.2 Non-consent Areas for Greater Sage-Grouse

Under the Non-consent Alternative, consent for leasing would not be given for National Forest System lands within a 3-mile buffer of active greater sage-grouse leks, which have been identified by NDOW as Core Breeding Habitat. The core breeding habitat includes the lek and nesting habitat. For surveyed public land sections, lands that fall outside of this boundary would be available for leasing down to a minimum size of 40-acre aliquot parts.

For unsurveyed public land sections, any sections containing core breeding habitat would not be available for leasing. The non-consent areas would total up to approximately 30,240 acres (30,238 rounded to the nearest 40 acres). Therefore, the Forest Service would only consent to lease up to approximately 585,000 acres of National Forest System lands that would be made administratively available for geothermal leasing. The lands to be made available that fall outside of core breeding habitat would be the Nevada portion of the Bridgeport Ranger District (approximately 578,758 acres), one area on the Austin Ranger District (3,961 acres), one area on the Tonopah District (166 acres), and one area on the Ely Ranger District (3,538 acres).

This alternative was considered but eliminated from detailed analysis because sage-grouse leks and core breeding habitat are not permanent, fixed geographic points and are subject to change. For example, leks may become inactive or habitat areas may change over time (e.g., loss of leks and/or habitat from a wildland fire). Non-consent should be reserved for known ground conditions that are not subject to change or where variability is rare. Non-consent for resources that are subject to change would make land management and administration more difficult. The leasing process should consider the conditions at the time of leasing. If non-consent was selected, there would be no flexibility to adjust land sections to reflect current ground conditions and if conditions changed in the future, any non-consent areas would have to be re-analyzed under a new NEPA analysis to provide any future consent for leasing. On unsurveyed lands, the BLM can only offer a whole section, so if any portion of a section intercepted a non-consent resource boundary, the entire section would not be available for lease.

2.8 REASONABLE FORESEEABLE DEVELOPMENT SCENARIO

2.8.1 Bridgeport Geothermal Decision Area

The 2008 Geothermal PEIS provides an RFDS for geothermal resources throughout the Western US, which includes the analysis areas. Specific to the Bridgeport District, the PEIS identifies two principal potential areas (Aurora and Wilson Hot Springs, or Barren Hills) as having commercially viable electrical generation capacity within the next 15 years. The PEIS projects the likely megawatt capacity that could be developed at each site by 2015 and by 2025. The PEIS projection is biased towards the higher end of expected development

but acknowledges that additional unknown or unexpected development may occur at other sites within the analysis areas.

The Aurora area has a projected capacity of 240 MW by 2025. The Wilson Hot Springs area has a projected capacity of 20 MW by 2025.

Estimates of other areas that may have geothermal potential but have not yet been identified can be taken from the Nevada Bureau of Mines and Geology, which considers about 85 percent of the Bridgeport Ranger District lands in Nevada, or 516,426 acres, as having favorable geothermal potential capable of supporting electric power production. This favorable potential rating does not necessarily mean that these lands have commercially viable capacity, but it does suggest that additional exploration would be needed to determine if developable geothermal resources exist. For the purposes of this RFDS, the yet-to-be identified areas are estimated to have an additional 80 MW of projected capacity by 2025.

Based on the potential production capacity for the Aurora and Wilson Hot Springs and Barren Hills areas, and the yet-to-be identified areas, potential for the entire Bridgeport Geothermal Decision Area was estimated to be 170 MW by 2025. As shown in **Table 2-3**, Potential Production Capacity, the Aurora, Wilson Hot Springs, and yet-to-be identified areas are reasonably expected to see geothermal development activity in the foreseeable future up to a total of 340 MW. Since only a portion of these resource areas are on National Forest System lands, and since the Aurora and Wilson Hot Springs and Barren Hills areas are excluded from this analysis, only a portion of such development would be expected to occur on National Forest System lands within the Bridgeport Geothermal Decision Area. It is assumed that one half (50 percent) of the development in these areas would occur on National Forest System lands within the decision area. Application of this factor (0.50) to 340 MW results in an RFDS for National Forest System lands within the decision area of 170 MW by 2025.

Table 2-3
Potential Production Capacity within the Bridgeport Geothermal Decision Area

Area of Potential	Projected MW at 2025
Aurora	240
Wilson Hot Springs/Barren Hills	20
Yet-to-be Identified Areas	80
TOTAL	**340**
50% Development on National Forest System lands Assumption	***170***

As of January 2010, there were 552 leases in Nevada comprising more than 1.1 million acres, including 14 geothermal power plants with a total generation capacity of 342 MW.

Estimates of disturbance based on the phases of geothermal leasing and development are discussed in detail in the 2008 Geothermal PEIS. Table 2-8 of the PEIS provides an estimate of a typical range of acres disturbed to develop a 30- to 50-MW geothermal power plant. This estimate of acres disturbed and the discussion of typical operational phases constitute the RFDS for analyzing the effects of geothermal leasing on the Forest. For analysis purposes, it is assumed that in areas with projected generating capacity greater than 50 MW, there would be multiple power plants rather than one large plant. For example, if the Aurora area is developed, it is assumed that it would be accomplished with six 30-MW power plants or some other combination of capacities to total the estimated 240 MW for that area.

This RFDS for geothermal resource use involves four sequential phases: (1) exploration, (2) drilling, (3) utilization, and (4) reclamation and abandonment. The success or failure of each phase affects the implementation of subsequent phases, and, therefore, subsequent environmental impacts. The general assumptions outlined in the PEIS about the four phases serve to establish RFDS scenarios for analyzing future environmental impacts that may result from development following BLM issuance of leases for geothermal resources within the identified area of geothermal potential. It should be noted that the RFDS scenario permits a general evaluation of the types of impacts that may occur but cannot accurately predict the magnitude and extent of these impacts. This is due in part to the uncertainty about the timing, location, distribution of the geothermal resources, and the likely types of development.

Since the entire decision area RFDS estimates a total production capacity of 170 MW by 2025, and the average power plant is in the range of 30 MW to 50 MW in capacity, then it is estimated that three to six power plants would be built across the decision area. **Table 2-4**, Typical Disturbances by Phase of Geothermal Resource Development, shows the acreages of disturbance for a typical power plant in the size range of 30 to 50 MW.

The total acreage of disturbance for a single power plant ranges from 53 to 367 acres. This wide range is largely due to the project-by-project variation in distance to transmission and the varying acres of disturbance associated with long versus short transmission line construction. Maximum development of six power plants would result in as many as 2,202 total estimated disturbed acres across the decision area.

Table 2-4
Typical Disturbances by Phase of Geothermal Resource Development

Development Phase	Disturbance Estimate per Plant
Exploration	2 – 7 acres
Geologic mapping	negligible
Geophysical surveys	30 square feet[1]
Gravity and magnetic surveys	negligible
Seismic surveys	negligible
Resistivity surveys	negligible
Shallow temperature measurements	negligible
Road/access construction	1- 6 acres
Temperature gradient wells	1 acre[2]
Drilling Operations and Utilization	51 – 350 acres
Drilling and well field development	5 – 50 acres[3]
Road improvement/construction	4 – 32 acres[4]
Power plant construction	15 – 25 acres[5]
Installing well-field equipment including pipelines	5 – 20[6]
Installing transmission lines	24 – 240[7]
Well workovers, repairs and maintenance	Negligible[8]
TOTAL	**53 – 367 acres**

[1] Calculated assuming 10 soil gas samples at a disturbance of less than three square feet each.

[2] Calculated assuming area of disturbance of 0.05 to 0.25 acre per well and six wells. Estimate is a representative average disturbance of all well sites. Some wells may require a small footprint (e.g., 30 by 30 feet), while others may require larger rigs and pads (e.g., 150 by150 feet).

[3] Size of the well pad varies greatly based on the site-specific conditions. Based on a literature review, well pads range from 0.7 acres up to 5 acres. Generally a 30-MW to 50-MW power plant requires about five to 10 well pads to support 10 to 25 production wells and five to 10 injection wells. Multiple wells may be located on a single well pad.

[4] One-half mile to nine miles; assumes about 0.25 mile of road per well. Estimates 30-foot-wide surface disturbance for an 18- to 20-foot road surface, including cut and fill slopes and ditches.

[5] Constructing a 30-MW power plant disturbs approximately 15 acres; a 50-MW power plant disturbs approximately 25 acres.

[6] Pipelines between well pad to plant assumed to be 0.25 mile or less, for a total of 1.5 to 7 miles of pipeline in length, with a 25-foot-wide corridor

[7] Five to 50 miles long, 40-foot-wide corridor.

[8] Disturbance would be limited to previously disturbed areas around the well(s).

Source: BLM and Forest Service 2008

2.8.2 Austin, Ely, and Tonopah Geothermal Decision Areas

In addition to the RFDS for the Bridgeport Geothermal Decision Area, site-specific RFDSs have been developed for the individual parcels that are analyzed in this EIS. These three areas include one on the Austin Ranger District (3,961 acres), one on the Tonopah District (166 acres), and one on the Ely Ranger District (3,538 acres), for a total of 7,665 acres. Existing literature provides no

estimates of geothermal potential for these specific areas. To provide an estimate for the purpose of this RFDS, the assumption is made that, on a per-site basis, geothermal resources of sufficient quantity and quality would be present to support one 50-MW power plant, that such a sized plant would be constructed, and that up to 367 acres would be disturbed.

The RFDS for these three decision areas would add an additional 150 MW and 1,101 acres of disturbance to the RFDS. Therefore, the total RFDS for the project, including the Bridgeport, Austin, Ely, and Tonopah Geothermal Decision Areas, is 320 MW produced by 9 power plants, resulting in a long-term disturbance of approximately 3,300 acres. This RFDS is an estimate of the maximum potential development and disturbance. Actual development and disturbance may be much lower and would be determined based on the future phases of geothermal development as well as constraints identified for each of the decision areas.

2.9 SUMMARY OF IMPACTS

Table 2-5, Summary of Impacts in the Decision Areas by Resource and Alternative, provides a summary of potential impacts, by resource resulting from the Proposed Action and action alternatives.

Table 2-5
Summary of Impacts in the Decision Areas by Resource and Alternative

	Alternative 1 - Proposed Action	Alternative 2 - Proposed Action with Enhanced Stipulations for Sage-grouse, and Traditional Cultural Properties (TCPs) and Sacred Sites	Alternative 3 - No Action Alternative	Alternative 4 (Preferred Alternative) - Proposed Action with Updated Sage-grouse Management
Land Use				
Bridgeport Decision Area	Three to six power plants would be developed in this area. It is anticipated that each power plant would disturb a maximum of 367 acres, resulting in a maximum of approximately 2,202 acres of disturbance in the Bridgeport Decision Area. It is anticipated that impacts would be minimized by the implementation of BMPs and additional lease stipulations, including a CSU stipulation to ensure compatibility with sensitive urban interface areas. BLM and operators would contact appropriate agencies, property owners, and other stakeholders early in the project planning process to identify potentially sensitive land uses and issues and as a result requiring specific measures to maintain public uses and values.	Impacts under Alternative 2 would be similar to those described for Alternative 1. Additional protection measures for greater sage-grouse and Native American concerns would increase the acreage subject to NSO sage-grouse stipulations to approximately 169,600 acres within the decision area.	Issuing geothermal leases on a case-by-case basis based on the Humboldt and Toiyabe LRMPs is not expected to directly affect land use and access. However, if the Forest Service does not provide consent to geothermal leasing, lease nominations and project development would likely result in fragmented and segregated land uses and adverse access conditions on roads within the decision area. Measures to protect land use on National Forest System lands and adjacent lands from impacts would be determined on a case by case basis. Due to the uncertainty of total acreage considered for geothermal leasing and development, it is not possible to quantify the total acreage affected in this decision area.	Impacts under Alternative 4 would be similar to those described for Alternative 1. The updated habitat data and protection measures for greater sage-grouse would increase the acreage subject to NSO sage-grouse stipulations to approximately 183,900 acres.
Austin Decision Area	Impacts and methods of minimizing impacts on land use and access would be similar to those described for the Bridgeport Geothermal	Impacts on land use and access would be similar to those described for the Bridgeport Geothermal Decision Area. The NSO sage-grouse stipulations for	Impacts on land use and access would be the same as those described for the Bridgeport Geothermal Decision Area.	The NSO stipulations for sage-grouse would apply to approximately 3,110 acres within the decision area. NSOs would apply to the majority of

Table 2-5
Summary of Impacts in the Decision Areas by Resource and Alternative

	Alternative 1 - Proposed Action	Alternative 2 - Proposed Action with Enhanced Stipulations for Sage-grouse, and Traditional Cultural Properties (TCPs) and Sacred Sites	Alternative 3 - No Action Alternative	Alternative 4 (Preferred Alternative) - Proposed Action with Updated Sage-grouse Management
	Decision Area. One power plant would be developed in this area, resulting in a maximum of approximately 367 acres of disturbance.	sage-grouse would apply to approximately 1,600 acres within the decision area.		the decision area and limit the potential for development. Previously authorized land uses would not be affected.
Ely Decision Area	Impacts on land use and access would be the same as those described for the Bridgeport Geothermal Decision Area.	Impacts on land use and access would be similar to those described for the Bridgeport Geothermal Decision Area. The NSO stipulations for sage-grouse would apply to approximately 3,300 acres within the decision area. Other previously authorized land uses would not be affected.	Impacts on land use and access would be the same as those described for the Bridgeport Geothermal Decision Area.	The updated habitat data and protection measures for greater sage-grouse would decrease the acreage subject to NSO sage-grouse stipulations to approximately 800 acres within the decision area.
Tonopah Decision Area	Impacts on land use and access would be similar to those described for the Bridgeport Geothermal Decision Area. One power plant developed resulting in a maximum of approximately 367 acres of disturbance.	Impacts under Alternative 2 would be similar to those described for Alternative 1. However, additional protection measures for Native American concerns would increase the acreage subject to NSO stipulations.	Impacts on land use and access would be the same as those described for the Bridgeport Geothermal Decision Area.	The updated habitat data and protection measures for greater sage-grouse (including the bi-state population) would increase the acreage subject to NSO. The NSO stipulations for sage-grouse would apply to the entire decision area.
Special Designations				
Bridgeport Decision Area	Three to six power plants would be developed in this area, resulting in a range of approximately 1,101 to 2,202 acres of disturbance. It is anticipated that impacts under	Impacts under Alternative 2 would be similar to those described for Alternative 1. Additional protection measures for greater sage-grouse and Native American concerns would	Under Alternative 3, lease applications would continue to be processed on a case-by-case basis. The number of acres that could impact special designation areas is unknown; however,	Impacts under Alternative 4 would be similar to those described for Alternative 1. The acreage subject to NSO stipulations for sage-grouse would apply to approximately

Table 2-5
Summary of Impacts in the Decision Areas by Resource and Alternative

	Alternative 1 - Proposed Action	Alternative 2 - Proposed Action with Enhanced Stipulations for Sage-grouse, and Traditional Cultural Properties (TCPs) and Sacred Sites	Alternative 3 - No Action Alternative	Alternative 4 (Preferred Alternative) - Proposed Action with Updated Sage-grouse Management
	Alternative 1 would be negligible because restrictions and closures for special designation areas would largely preclude development. There would be no surface occupancy of potentially eligible WSRs.	increase the acreage protected with an NSO sage-grouse stipulation on approximately 169,600 acres.	impacts are expected to be negligible because management actions for special designations either close or restrict development.	183,900 acres. The number of acres that could impact special designation areas is unknown; however, impacts are expected to be negligible because management actions for special designations which would either close or restrict development.
Austin Decision Area	There are no special designation areas in the Austin Geothermal Decision Area; therefore, there would be no impacts.	There are no special designation areas in the Austin Geothermal Decision Area; therefore, there would be no impacts.	There are no special designation areas in the Austin Geothermal Decision Area; therefore, there would be no impacts.	There are no special designation areas in the Austin Geothermal Decision Area; therefore, there would be no impacts.
Ely Decision Area	Impacts on special designation areas would be similar to those described for the Bridgeport Geothermal Decision Area. One power plant would be developed in this area resulting in a range of approximately 53 to 367 acres of disturbance. The non-discretionary restriction on designated roadless areas would likely preclude geothermal development in the portions of the Cottonwood and Indian Creek Roadless Areas within the Ely Geothermal Decisions Area meaning impacts would be negligible.	Impacts under Alternative 2 would be similar to those described for Alternative 1. However, additional protection measures for greater sage-grouse and Native American concerns would increase the acreage that would be protected with an NSO sage-grouse stipulation on approximately 3,300 acres.	Impacts on special designation areas would be the same as those described for the Bridgeport Geothermal Decision Area.	Impacts under Alternative 4 would be similar to those described for Alternative 1. The updated habitat data and protection measures for greater sage-grouse would decrease the acreage subject to NSO sage-grouse stipulations on approximately 800 acres.

Table 2-5
Summary of Impacts in the Decision Areas by Resource and Alternative

	Alternative 1 - Proposed Action	Alternative 2 - Proposed Action with Enhanced Stipulations for Sage-grouse, and Traditional Cultural Properties (TCPs) and Sacred Sites	Alternative 3 - No Action Alternative	Alternative 4 (Preferred Alternative) - Proposed Action with Updated Sage-grouse Management
Tonopah Decision Area	Approximately 160 acres of the Arc Dome-Carvers Roadless Area lies within the Tonopah Geothermal Decision Area; therefore, development of a geothermal plant is unlikely and would not be allowed unless new road construction is approved by the Secretary of Agriculture.	Impacts under Alternative 2 would be similar to those described for Alternative 1. However, additional protection measures for Native American concerns would further limit the acreage that would be available for development.	Impacts on special designation areas would be similar to those described under Alternative 1.	The updated habitat data and protection measures for sage-grouse would increase the acreage subject to NSO and further restrict geothermal development within the entire decision area. Therefore, impacts on special designations would be minimal.
Recreation				
Bridgeport Decision Area	Three to six power plants would be developed in this area resulting in a range of approximately 1,101 to 2,202 acres of disturbance. It is anticipated that impacts under Alternative 1 would be the minimized due to the implementation of BMPs and additional lease stipulations.	Impacts under Alternative 2 would be similar to those described for Alternative 1. Additional protection measures for greater sage-grouse and Native American concerns would increase the acreage that would be protected with an NSO sage-grouse stipulation on approximately 169,600 acres.	Under Alternative 3, lease applications would continue to be processed on a case-by-case basis. The number of acres that could impact recreation is unknown; however, impacts would be site-specific. Under this alternative fragmented and segregated geothermal planning could increase impacts on recreation compared to Alternative 1.	Impacts under Alternative 4 would be similar to those described for Alternative 1. Updated habitat data and protection measures for sage-grouse would increase the acreage subject to NSO sage-grouse stipulations on approximately 189,300 acres within the decision area.
Austin Decision Area	Impacts on recreation would be similar to those described for the Bridgeport Geothermal Decision Area. One power plant would be developed in this area resulting in a range of approximately 53 to 367 acres of disturbance. It is anticipated	Impacts under Alternative 2 would be similar to those described for Alternative 1. Additional protection measures for greater sage-grouse and Native American concerns would increase the acreage that would be protected with an NSO sage-	Impacts on recreation would be the same as those described for the Bridgeport Geothermal Decision Area.	Impacts on recreation would be similar to those described for Alternative 1. The updated habitat data and protection measures for sage-grouse would increase the acreage subject to NSO sage-grouse stipulations on approximately

Table 2-5
Summary of Impacts in the Decision Areas by Resource and Alternative

	Alternative 1 - Proposed Action	Alternative 2 - Proposed Action with Enhanced Stipulations for Sage-grouse, and Traditional Cultural Properties (TCPs) and Sacred Sites	Alternative 3 - No Action Alternative	Alternative 4 (Preferred Alternative) - Proposed Action with Updated Sage-grouse Management
	that impacts under Alternative 1 would be the minimized due to the implementation of BMPs and lease stipulations.	grouse stipulation on approximately 1,600 acres.		3,110 acres.
Ely Decision Area	Impacts on recreation would be the same as those described for the Austin Geothermal Decision Area.	Impacts on recreation would be the same as those described for the Bridgeport Geothermal Decision Area. The NSO stipulations for sage-grouse would apply to approximately 3,300 acres within the decision area.	Impacts on recreation would be the same as those described for the Bridgeport Geothermal Decision Area.	Impact under this alternative would be similar to those described for the Austin Geothermal Decision Area. The NSO stipulations for sage-grouse would apply to approximately 800 acres within the decision area.
Tonopah Decision Area	Impacts on recreation would be the same as those described for the Austin Geothermal Decision Area.	Impacts on recreation would be the same as those described for the Austin Geothermal Decision Area.	Impacts on recreation would be the same as those described for the Bridgeport Geothermal Decision Area.	The updated habitat data and protection measures for sage-grouse would increase the acreage subject to NSO and further restrict geothermal development within the entire decision area, reducing impacts on recreation.
Geologic Resources and Seismic Setting				
Bridgeport Decision Area	Approximately 602,115 acres in the Bridgeport Geothermal Decision Area would be consented for leasing. As there are no known unique geologic features within the decision area, there would be no impacts on them as a result of geothermal development. If, at a	Impacts under Alternative 2 would be similar to those described for Alternative 1. However, additional protection measures for greater sage-grouse and Native American concerns would increase the acreage that would be subject to NSO sage-grouse stipulations on	Under Alternative 3, lease applications would continue to be processed on a case-by-case basis. The number of acres likely to be affected under this alternative is unknown. Issuing geothermal leases on a case-by-case basis includes avoiding potential impacts from	Impacts under Alternative 4 would be similar to those described for Alternative 1. However, the updated habitat data and protection measures for sage-grouse would increase the acreage subject to NSO sage-grouse stipulations to approximately 183,900 acres.

Table 2-5
Summary of Impacts in the Decision Areas by Resource and Alternative

	Alternative 1 - Proposed Action	Alternative 2 - Proposed Action with Enhanced Stipulations for Sage-grouse, and Traditional Cultural Properties (TCPs) and Sacred Sites	Alternative 3 - No Action Alternative	Alternative 4 (Preferred Alternative) - Proposed Action with Updated Sage-grouse Management
	later date, unique geologic features are determined to be within the area of effect of proposed development, then stipulations for avoiding direct would need to be applied to prevent impacts. As the area is still seismically active, there is a small increased likelihood for seismic activity to affect geothermal development facilities.	approximately 169,600 acres.	anticipated future actions on any unique geologic resources. Unique geologic resources may receive protection through avoidance and mitigation measures for other resources, where those resources include unique geologic features.	
Austin Decision Area	Approximately 3,961 acres in the Austin Geothermal Decision Area would be consented for leasing. Impacts as a result of geothermal development would be the same as those described for the Bridgeport Geothermal Decision Area.	Impacts under Alternative 2 would be similar to those described for the Bridgeport Geothermal Development Area. The NSO stipulations for sage-grouse would apply to approximately 1,600 acres within the decision area.	Impacts would be the same as those described for the Bridgeport Geothermal Decision Area.	Impacts on geological resources and seismic setting would be similar to those described for the Bridgeport Geothermal Decision Area. However, the NSO stipulations for sage-grouse would apply to approximately 3,110 acres within the decision area.
Ely Decision Area	Approximately 3,538 acres of in the Ely Geothermal Decision Area would be consented for leasing. Impacts as a result of geothermal development would be the same as those described for the Bridgeport Geothermal Decision Area.	Impacts would be similar to those described for the Bridgeport Geothermal Decision Area. However, the NSO stipulations for sage-grouse would apply to approximately 3,300 acres within the decision area.	Impacts would be the same as those described for the Bridgeport Geothermal Decision Area.	Impacts would be similar to those described for the Bridgeport Geothermal Decision Area. Updated habitat data and protection measures for sage-grouse would decrease the acreage subject to NSO sage-grouse stipulations on approximately 800 acres.

Table 2-5
Summary of Impacts in the Decision Areas by Resource and Alternative

	Alternative 1 - Proposed Action	Alternative 2 - Proposed Action with Enhanced Stipulations for Sage-grouse, and Traditional Cultural Properties (TCPs) and Sacred Sites	Alternative 3 - No Action Alternative	Alternative 4 (Preferred Alternative) - Proposed Action with Updated Sage-grouse Management
Tonopah Decision Area	Approximately 166 acres of in the Tonopah Geothermal Decision Area would be consented for leasing. Impacts as a result of geothermal development would be the same as those described for the Bridgeport Geothermal Decision Area.	Impacts would be the same as those described for the Bridgeport Geothermal Decision Area.	Impacts would be the same as those described for the Bridgeport Geothermal Decision Area.	The updated habitat data and protection measures for sage-grouse would increase the acreage subject to NSO and further restrict geothermal development within the entire decision area.
Energy and Mineral Resources				
Bridgeport Decision Area	Approximately 602,115 acres would be consented for leasing. There would be no impacts on energy and minerals as a result of leasing however there could be impacts associated with future geothermal development. Alternative 1 could increase the value and amount of geothermal energy production for the state and electrical power brought onto the Nevada and national grids.	Impacts under Alternative 2 would be similar to those described for Alternative 1. However, additional protection measures for greater sage-grouse and Native American concerns would increase the acreage subject to NSO sage-grouse stipulations on approximately 169,600 acres within the decision area.	Under Alternative 3, lease applications would continue to be processed on a case-by-case basis. The number of acres likely to be affected under this alternative is unknown. Under Alternative 3, lease nominations and project development would likely result in fragmented or segregated development of energy and mineral resources.	Impacts under Alternative 4 would be similar to those described for Alternative 2. However, the updated habitat data and protection measures for greater sage-grouse (including the bi-state population) would increase the acreage subject to NSO sage-grouse stipulations on approximately 183,900 acres within the decision area.
Austin Decision Area	The Forest Service would consent to lease up to approximately 3,961 acres of National Forest System lands. The types of impacts would be the same as those described for the Bridgeport Geothermal Decision Area.	The types of impacts would be similar to those described for the Bridgeport Geothermal Decision Area. The NSO stipulations for sage-grouse would apply to approximately 1,600 acres within the decision area.	Impacts would be the same as those described for the Bridgeport Geothermal Decision Area.	Impacts on energy and mineral resources would be similar to those described for the Bridgeport Geothermal Decision Area. However, the NSO stipulations for sage-grouse would apply to approximately 3,110 acres.

Table 2-5
Summary of Impacts in the Decision Areas by Resource and Alternative

	Alternative 1 - Proposed Action	Alternative 2 - Proposed Action with Enhanced Stipulations for Sage-grouse, and Traditional Cultural Properties (TCPs) and Sacred Sites	Alternative 3 - No Action Alternative	Alternative 4 (Preferred Alternative) - Proposed Action with Updated Sage-grouse Management
Ely Decision Area	The Forest Service would consent to lease up to approximately 3,538 acres of National Forest System lands. The types of impacts would be the same as those described for the Bridgeport Geothermal Decision Area.	The types of impacts would be similar to those described for the Bridgeport Geothermal Decision Area. The NSO stipulations for sage-grouse would apply to approximately 3,300 acres within the decision area.	Impacts would be the same as those described for the Bridgeport Geothermal Decision Area.	Impacts under Alternative 4 would be similar to those described for the Bridgeport Geothermal Decision Area. The NSO stipulations for sage-grouse would apply to approximately 800 acres.
Tonopah Decision Area	As many as 166 acres would be consented for leasing. The types of impacts would be the same as those described for the Bridgeport Geothermal Decision Area. However, impacts from geothermal development within the Tonopah Geothermal Decision Area would disturb the entire decision area and thus reduce the likelihood of other mineral or energy developments in the area.	Impacts under Alternative 2 would be similar to those described for Alternative 1. However, additional protection measures for Native American concerns would increase the acreage subject to NSO stipulations.	Impacts would be the same as those described for the Bridgeport Geothermal Decision Area.	Impacts would be similar to those described for the Bridgeport Geothermal Decision Area. The updated habitat data and protection measures for sage-grouse would increase the acreage subject to NSO, which would include the entire decision area.
Paleontological Resources				
Bridgeport Decision Area	Up to 2,202 acres would be disturbed. There is a known paleontological resource within the Bridgeport Geothermal Decision Area, so there is potential for impacts as a result of geothermal development. If paleontological resources are	Impacts under Alternative 2 would be similar to those described for Alternative 1. Additional protection measures for greater sage-grouse and Native American concerns would increase the acreage that would be protected with an NSO sage-	Under Alternative 3, lease applications would continue to be processed on a case-by-case basis. The number of acres likely to be affected under this alternative is unknown. Overall potential impacts on paleontological resources from	Impacts under Alternative 4 would be similar to those described for Alternative 1. However, the updated habitat data and protection measures for greater sage-grouse (including the bi-state population) would increase the

Table 2-5
Summary of Impacts in the Decision Areas by Resource and Alternative

	Alternative 1 - Proposed Action	Alternative 2 - Proposed Action with Enhanced Stipulations for Sage-grouse, and Traditional Cultural Properties (TCPs) and Sacred Sites	Alternative 3 - No Action Alternative	Alternative 4 (Preferred Alternative) - Proposed Action with Updated Sage-grouse Management
	determined to be within the area of effect of proposed development, then stipulations for avoiding said resources would need to be applied to prevent impacts.	grouse stipulation of approximately 169,600 acres.	anticipated future actions would be similar to those identified under Alternatives 1 and 2, though the fragmented approach could result in greater impacts on paleontological resources.	acreage subject to NSO for sage-grouse on approximately 183,900 acres within the decision area.
Austin Decision Area	Up to 367 acres would be disturbed. Potential impacts would be limited due to the small surface-disturbance footprint for each project. If paleontological resources are determined to be within the area of effect of proposed development, then the existing stipulations for avoiding said resources would need to be applied to prevent impacts.	Impacts under Alternative 2 would be similar to those described for Alternative 1. However, additional protection measures for greater sage-grouse and Native American concerns would increase the acreage that would be protected with an NSO sage-grouse stipulation on approximately 1,600 acres within the decision area.	Impacts would be the same as those described for the Bridgeport Geothermal Decision Area.	Impacts on paleontological resources would be similar to those described for Alternative 2. However, the NSO stipulations for sage-grouse would apply to approximately 3,110 acres within the decision area.
Ely Decision Area	Up to 367 acres would be disturbed. Impacts would be similar to those described as common for all decision areas; however, considering that all of the area is of Cenozoic era geology, there is a higher likelihood for paleontological resources from this era to be discovered during project development.	Impacts under Alternative 2 would be similar to those described for Alternative 1. However, additional protection measures for greater sage-grouse and Native American concerns would increase the acreage that would be protected with an NSO sage-grouse stipulation to approximately 3,300 acres.	Impacts would be the same as those described for the Bridgeport Geothermal Decision Area.	Impacts under Alternative 4 would be similar to those described for Alternative 2. However, the NSO stipulations for sage-grouse would apply to approximately 800 acres within the decision area.

Table 2-5
Summary of Impacts in the Decision Areas by Resource and Alternative

	Alternative 1 - Proposed Action	Alternative 2 - Proposed Action with Enhanced Stipulations for Sage-grouse, and Traditional Cultural Properties (TCPs) and Sacred Sites	Alternative 3 - No Action Alternative	Alternative 4 (Preferred Alternative) - Proposed Action with Updated Sage-grouse Management
Tonopah Decision Area	Up to 166 acres would be disturbed. Considering that all of the area is of Cenozoic era geology, there is a higher likelihood for paleontological resources from this era to be discovered during project development.	Impacts under Alternative 2 would be similar to those described for Alternative 1. Additional protection measures for Native American concerns would increase the acreage that would be protected with an NSO stipulation.	Impacts would be the same as those described for the Bridgeport Geothermal Decision Area.	The updated habitat data and protection measures for sage-grouse would increase the acreage subject to NSO stipulations to the entire decision area.
Soil Resources				
Bridgeport Decision Area	Up to 2,202 acres would be disturbed. Alternative 1 would not have any direct impact on soil resources; however, future geothermal exploration and development activities would disturb soils and potentially result in soil compaction and soil erosion. Stipulations determined to be reasonable and necessary to protect soil resources and BMPs would reduce potential impacts on soils.	Impacts under Alternative 2 would be similar to those described for Alternative 1. Additional protection measures for greater sage-grouse and Native American concerns would increase acreage subject to NSO sage-grouse stipulations on approximately 169,600 acres.	Issuing geothermal leases on a case-by-case basis based on the Humboldt and Toiyabe LRMPs is not expected to directly affect soils. However, lease nominations and project development would likely result in fragmented and segregated development and adverse impacts on soils within the decision area. Due to the uncertainty of total acreage considered for geothermal leasing and development, it is not possible to quantify the total acreage affected in this decision area.	Impacts under Alternative 4 would be similar to those described for Alternative 2. However, the updated habitat data and protection measures for greater sage-grouse (including the bi-state population) would increase the acreage subject to NSO sage-grouse stipulations on approximately 183,900 acres.
Austin Decision Area	Up to 367 acres would be disturbed. Impacts on these lands would be the same as those described for the Bridgeport Geothermal	Impacts associated with Alternative 2 would be the same as those described for the Bridgeport Geothermal Decision Area. The NSO stipulations for	Impacts associated with Alternative 3 would be the same as those described for the Bridgeport Geothermal Decision Area.	Impacts on soil resources would be similar to those described for the Bridgeport Geothermal Decision Area. However, the NSO

Table 2-5
Summary of Impacts in the Decision Areas by Resource and Alternative

	Alternative 1 - Proposed Action	Alternative 2 - Proposed Action with Enhanced Stipulations for Sage-grouse, and Traditional Cultural Properties (TCPs) and Sacred Sites	Alternative 3 - No Action Alternative	Alternative 4 (Preferred Alternative) - Proposed Action with Updated Sage-grouse Management
	Decision Area.	sage-grouse would apply to approximately 1,600 acres.		stipulations for sage-grouse would apply to approximately 3,110 acres.
Ely Decision Area	Up to 367 acres would be disturbed. Impacts on these lands would be the same as those described for the Bridgeport Geothermal Decision Area.	Impacts associated with Alternative 2 would be the same as those described for the Bridgeport Geothermal Decision Area. The NSO stipulations for sage-grouse would apply to approximately 3,300 acres within the decision area.	The impacts associated with Alternative 3 are the same as those described for the Bridgeport Geothermal Decision Area.	Impacts under Alternative 4 would be similar to those described for Alternative 2. However, updated habitat data and protection measures for greater sage-grouse would decrease the acreage subject to NSO sage-grouse stipulations on approximately 800 acres within the decision area.
Tonopah Decision Area	Up to 166 acres would be disturbed. Impacts on these lands would be the same as those described for the Bridgeport Geothermal Decision Area.	Impacts associated with Alternative 2 would be similar to those described for the Bridgeport Geothermal Decision Area	The impacts associated with Alternative 3 would be the same as those described for the Bridgeport Decision Area.	The updated habitat data and protection measures for sage-grouse would increase the acreage subject to NSO and restrict geothermal development within the entire decision area.
Water Resources (Surface and Ground)				
Bridgeport Decision Area	Alternative 1 would not have any direct impact on water resources; however, anticipated geothermal exploration and development activities likely to follow leasing would potentially result in impacts. Potential impacts would be reduced	Impacts under Alternative 2 would be similar to those described for Alternative 1. However, additional protection measures for greater sage-grouse and Native American concerns would increase the acreage that would be protected with an	Under Alternative 3, processing of geothermal lease applications and nominations would continue; however, they would be evaluated on a case-by-case basis under separate NEPA analyses. Since the location, timing and types of	Impacts under Alternative 4 would be similar to those described for Alternative 2. However, the updated habitat data and protection measures for greater sage-grouse (including the bi-state population) would increase the

Table 2-5
Summary of Impacts in the Decision Areas by Resource and Alternative

	Alternative 1 - Proposed Action	Alternative 2 - Proposed Action with Enhanced Stipulations for Sage-grouse, and Traditional Cultural Properties (TCPs) and Sacred Sites	Alternative 3 - No Action Alternative	Alternative 4 (Preferred Alternative) - Proposed Action with Updated Sage-grouse Management
	through site specific analysis and development of mitigation or protection measures for future projects as well as implementation of BMPs and specific stipulations for water resources.	NSO sage-grouse stipulation on approximately 169,600 acres.	developments are unknown it is not possible to determine the impacts associated with this alternative. However, leasing on a case-by-case basis could result in fragmented development, which could increase impacts on water resources.	acreage subject to NSO sage-grouse stipulations to approximately 183,900 acres.
Austin Decision Area	Up to 367 acres would be disturbed. Impacts would be the same as those described for the Bridgeport Geothermal Decision Area.	Impacts would be the same as those described for the Bridgeport Geothermal Decision Area. The NSO stipulations for sage-grouse would apply to approximately 1,600 acres.	The impacts associated with Alternative 3 would be the same as those described for the Bridgeport Decision Area.	Impacts on water resources would be similar to those described for the Bridgeport Geothermal Decision Area. However, the NSO stipulations for sage-grouse would apply to approximately 3,110 acres.
Ely Decision Area	Up to 367 acres would be disturbed. Impacts would be the same as those described for the Bridgeport Geothermal Decision Area.	Impacts would be the same as those described for the Bridgeport Geothermal Decision Area. The NSO stipulations for sage-grouse would apply to approximately 3,300 acres.	The impacts associated with Alternative 3 would be the same as those described for the Bridgeport Geothermal Decision Area.	Impacts would be similar to those described for the Bridgeport Geothermal Decision Area. The NSO stipulations for sage-grouse would apply to approximately 800 acres.
Tonopah Decision Area	Up to 166 acres would be disturbed. Impacts would be the same as those described for the Bridgeport Geothermal Decision Area.	Impacts would be similar to those described for the Bridgeport Geothermal Decision Area.	The impacts associated with Alternative 3 would be the same as those described for the Bridgeport Geothermal Decision Area.	The updated habitat data and protection measures for sage-grouse would increase the acreage subject to NSO and restrict geothermal development within the entire decision area.

Table 2-5
Summary of Impacts in the Decision Areas by Resource and Alternative

	Alternative 1 - Proposed Action	Alternative 2 - Proposed Action with Enhanced Stipulations for Sage-grouse, and Traditional Cultural Properties (TCPs) and Sacred Sites	Alternative 3 - No Action Alternative	Alternative 4 (Preferred Alternative) - Proposed Action with Updated Sage-grouse Management
Air Quality and Related Values				
Bridgeport Decision Area	Three to six power plants would be developed with 1,101 to 2,202 total acres of disturbance. Please see Section 4.10.4 for specific mitigation measures within the plan. It is expected that these measures would effectively minimize impacts on air quality and atmospheric values by reducing sources of air quality degradation.	Impacts under Alternative 2 would be similar to those described for Alternative 1. Additional protection measures for greater sage-grouse and Native American concerns would increase the acreage subject to NSO sage-grouse stipulations to approximately 169,600 acres within the decision area.	Indirect air quality impacts would be similar to those described for Alternative 1, though the pace of development could be slower. While a less regimented process would result under Alternative 3, measures to reduce air quality impacts would likely be similar to those that would be required under Alternative 1.	Impacts under Alternative 4 would be similar to those described for Alternative 1. The updated habitat data and protection measures for greater sage-grouse (including the bi-state population) would increase the acreage subject to NSO sage-grouse stipulations to approximately 183,900 acres within the decision area.
Austin Decision Area	Impacts on air quality would be the same or similar in nature to those described for the Bridgeport Geothermal Decision Area. One power plant would be developed in this area, resulting in 53 to 367 acres of disturbance. Up to 25 production wells and 10 injection wells would be developed per plant.	Impacts on air quality would be the same or similar to those described for the Bridgeport Geothermal Decision Area. The NSO stipulations for sage-grouse would apply to approximately 1,600 acres.	Impacts on air quality would be the same or similar to those described for the Bridgeport Geothermal Decision Area.	Impacts on air quality and air quality related values would be similar to those described for the Bridgeport Geothermal Decision Area. However, the NSO stipulations for sage-grouse would apply to approximately 3,110 acres.
Ely Decision Area	Impacts on air quality would be the same or similar to those described for the Austin Geothermal Decision Area	Impacts on air quality would be the same or similar to those described for the Bridgeport Geothermal Decision Area. The NSO stipulations for sage-grouse would apply to approximately 3,300 acres.	Impacts on air quality would be the same as those described for the Bridgeport Geothermal Decision Area.	Impacts would be similar to those described for the Bridgeport Geothermal Area. Updated habitat data and protection measures for greater sage-grouse would decrease the acreage subject

Table 2-5
Summary of Impacts in the Decision Areas by Resource and Alternative

	Alternative 1 - Proposed Action	Alternative 2 - Proposed Action with Enhanced Stipulations for Sage-grouse, and Traditional Cultural Properties (TCPs) and Sacred Sites	Alternative 3 - No Action Alternative	Alternative 4 (Preferred Alternative) - Proposed Action with Updated Sage-grouse Management
				to NSO stipulations to approximately 800 acres.
Tonopah Decision Area	Impacts on air quality would be the same or similar to those described for the Austin Geothermal Decision Area.	Impacts on air quality would be the same or similar to those described for the Bridgeport Geothermal Decision Area.	Impacts on air quality would be the same or similar to those described for the Austin Geothermal Decision Area.	Impacts on air quality would be the same or similar to those described for the Bridgeport Geothermal Decision Area. Updated habitat data and protection measures for sage-grouse would increase the acreage subject to NSO.
Vegetation				
Bridgeport Decision Area	Up to 2,202 acres would be permanently disturbed. The greatest impacts from geothermal leasing are likely in the pinyon-juniper and sagebrush vegetation communities. NSOs for sage-grouse would be applied on up to approximately 75,000 acres, which would protect vegetation from removal in these areas. Water bodies, riparian areas, and wetlands would be protected with an NSO stipulation, and a CSU stipulation would be applied within 500 feet of these areas.	Impacts under Alternative 2 would be similar to those described for Alternative 1. The NSO stipulations for sage-grouse would apply to approximately 169,600 acres within the decision area.	Under Alternative 3, lease applications would continue to be processed on a case-by-case basis. Areas closed to geothermal leasing by statute, regulation, or orders would remain closed, and discretionary closed areas would be assessed based on local land use plans. The number of acres that could impact vegetation is unknown; however, impacts would be site-specific thus resulting in fragmented and segregated planning for vegetation, which often substantially increases impacts.	Impacts under Alternative 4 would be similar to those described for Alternative 2. The acreage subject to NSO stipulations for sage-grouse would apply to approximately 183,900 acres.

Table 2-5
Summary of Impacts in the Decision Areas by Resource and Alternative

	Alternative 1 - Proposed Action	Alternative 2 - Proposed Action with Enhanced Stipulations for Sage-grouse, and Traditional Cultural Properties (TCPs) and Sacred Sites	Alternative 3 - No Action Alternative	Alternative 4 (Preferred Alternative) - Proposed Action with Updated Sage-grouse Management
Austin Decision Area	One plant would be constructed resulting in up to 367 acres being permanently disturbed. The greatest impacts from geothermal leasing are likely in the sagebrush vegetation community. NSOs would protect vegetation from removal in these areas. There are no water bodies, riparian areas, or wetlands within the decision area, so there would be no impacts on these vegetation communities.	Impacts under Alternative 2 would be the same as those described for the Bridgeport Geothermal Decision Area. The NSO stipulations for sage-grouse would apply to approximately 1,600 acres.	Under Alternative 3, impacts would be the same as those described for the Bridgeport Geothermal Decision Area	Impacts on vegetation would be similar to those described for the Bridgeport Geothermal Decision Area. However, the NSO stipulations for sage-grouse would apply to approximately 3,110 acres.
Ely Decision Area	One plant would be constructed resulting in up to 367 acres being permanently disturbed. The greatest impacts from geothermal leasing are likely in the sagebrush vegetation community. NSOs for sage-grouse would be applied on 3,300 acres, which would protect vegetation from removal in these areas. There are no water bodies, riparian areas, or wetlands within the decision area, so there would be no impacts on these vegetation communities.	Impacts under Alternative 2 would be would be similar to those described for the Bridgeport Geothermal Decision Area. The NSO stipulations for sage-grouse would apply to approximately 3,300 acres within the decision area.	Under Alternative 3, impacts would be the same as those described for the Bridgeport Geothermal Decision Area.	Impacts under Alternative 4 would be similar to those described for Alternative 1. Updated habitat data and protection measures for greater sage-grouse would decrease the acreage subject to NSO approximately 800 acres.

Table 2-5
Summary of Impacts in the Decision Areas by Resource and Alternative

	Alternative 1 - Proposed Action	Alternative 2 - Proposed Action with Enhanced Stipulations for Sage-grouse, and Traditional Cultural Properties (TCPs) and Sacred Sites	Alternative 3 - No Action Alternative	Alternative 4 (Preferred Alternative) - Proposed Action with Updated Sage-grouse Management
Tonopah Decision Area	One plant would be constructed resulting in up to 367 acres being permanently disturbed. The greatest impacts from geothermal leasing are likely in the salt desert shrub and semi desert shrub vegetation communities. There are no water bodies, riparian areas, or wetlands within the decision area, so there would be no impacts on these vegetation communities.	Impacts under Alternative 2 would be would be similar to those described for the Bridgeport Geothermal Decision Area.	Under Alternative 3, impacts would be the same as those described for the Bridgeport Geothermal Decision Area.	Impacts under Alternative 4 would be similar to those described for Alternative 1. The updated habitat data and protection measures for sage-grouse would increase the acreage subject to NSO and restrict geothermal development within the entire decision area. Therefore impacts on vegetation resources would be minimal.
Fish and Wildlife				
Bridgeport Decision Area	Up to 2,202 acres would be permanently disturbed. The greatest impacts from geothermal leasing are likely in the pinyon-juniper and sagebrush vegetation communities and the species that depend on this habitat. NSOs would be applied on up to approximately 169,600 acres, which would protect habitat from removal and wildlife from disturbance in these areas. No ground disturbing activities would be allowed during migratory bird nesting season unless a nest survey is	Impacts under Alternative 2 would be similar to those described for Alternative 1. Although the acres subject to NSO stipulations would be greater than under Alternative 1, the acres cannot be quantified at this time. The locations of sage-grouse nesting and early brood rearing habitat would need to be field verified during future phases of leasing and development.	Under Alternative 3, lease applications would continue to be processed on a case-by-case basis. The number of acres that could impact fish and wildlife is unknown. Under this alternative, no regionally specific list of stipulations would be used thus resulting in fragmented and segregated planning for wildlife and wildlife habitats which often exponentially increases impacts.	Impacts under Alternative 4 would be similar to those described for Alternative 2 and would incorporate the most recent science known about the greater sage-grouse. The NSO stipulations for sage-grouse would apply to approximately 183,900 acres within the decision area. By imposing greater limitations for the siting of geothermal plants and infrastructure, impacts on fish and wildlife and their habitats would be reduced.

Table 2-5
Summary of Impacts in the Decision Areas by Resource and Alternative

	Alternative 1 - Proposed Action	Alternative 2 - Proposed Action with Enhanced Stipulations for Sage-grouse, and Traditional Cultural Properties (TCPs) and Sacred Sites	Alternative 3 - No Action Alternative	Alternative 4 (Preferred Alternative) - Proposed Action with Updated Sage-grouse Management
	completed prior to ground disturbance.			
Austin Decision Area	Up to 367 acres would be permanently disturbed. The greatest impacts from geothermal leasing are likely in the sagebrush vegetation community and the species that depend on this habitat. NSOs would be applied, which would protect habitats and wildlife from disturbance in these areas.	Impacts under Alternative 2 would be the same as those described for the Bridgeport Geothermal Decision Area.	Under Alternative 3, impacts would be the same as those described for the Bridgeport Geothermal Decision Area.	Impacts under Alternative 4 would be similar to those described for Alternative 1. However, the NSO stipulations fore sage-grouse would apply to approximately 3,110 acres. By imposing greater limitations for the siting of geothermal plants and infrastructure, impacts on fish and wildlife and their habitats would be reduced.
Ely Decision Area	Up to 367 acres would be permanently disturbed. The greatest impacts from geothermal leasing are likely in the sagebrush vegetation community and the species that depend on this habitat type. NSOs would be applied on 3,300 acres, which would protect habitats and wildlife from disturbance in these areas. Elk occur only in the Ely Geothermal Decision and are likely to be affected by the development of geothermal facilities. Population-level effects could occur if development	Impacts under Alternative 2 would be the same as those described for the Bridgeport Geothermal Decision Area.	Under Alternative 3, impacts would be the same as those described for the Bridgeport Geothermal Decision Area.	Impacts under Alternative 4 would be similar to those described for Alternative 1. However, the NSO stipulations for sage-grouse would apply to approximately 800 acres within the decision area. This could allow for greater impacts on fish and wildlife and their habitats.

Table 2-5
Summary of Impacts in the Decision Areas by Resource and Alternative

	Alternative 1 - Proposed Action	Alternative 2 - Proposed Action with Enhanced Stipulations for Sage-grouse, and Traditional Cultural Properties (TCPs) and Sacred Sites	Alternative 3 - No Action Alternative	Alternative 4 (Preferred Alternative) - Proposed Action with Updated Sage-grouse Management
	were to occur in elk critical winter habitat or calving areas.			
Tonopah Decision Area	Up to 367 acres would be permanently disturbed with the greatest impacts from geothermal leasing likely in the salt desert shrub and semi desert shrub vegetation community and the species that depend on these habitat types. Indirect impacts could result from geothermal development include the potential for effects on trout and endemic fish in the White River and Ellison Creek.	Impacts under Alternative 2 would be the same as those described for the Bridgeport Geothermal Decision Area.	Under Alternative 3, impacts would be the same as those described for the Bridgeport Geothermal Decision Area.	Impacts under Alternative 4 would be similar to those described for Alternative 1. However, the acreage subject to NSO would increase and this would prevent impacts on fish and wildlife and their habitats.
Threatened, Endangered, and Special Status Species				
Bridgeport Decision Area	Up to 2,202 acres would be permanently disturbed with the greatest impacts from geothermal leasing are likely in the pinyon-juniper and sagebrush vegetation communities and the special status species that rely on these communities, such as pygmy rabbit, greater sage-grouse, Bodie Hills rockcress, and Webber ivesia.	NSO stipulations would be applied within three miles of active leks and within active sage-grouse nesting and active early brood-rearing habitat, if it falls outside the three mile radius from a lek. Although the acres subject to NSO stipulations would be greater than under Alternative 1, the acres cannot be quantified at this time. The locations of sage-grouse nesting and early brood rearing habitat would need to be field verified during future phases of leasing	Under Alternative 3, lease applications would continue to be processed on a case-by-case basis. Areas closed to geothermal leasing by statute, regulation, or orders would remain closed, and discretionary closed areas would be assessed based on the LRMP. The number of acres that could impact special status species is unknown. Under this alternative, no regionally specific list of stipulations would be used, thus resulting in	Impacts under Alternative 4 would be similar to those described for Alternative 1. However, the acreage subject to NSO for sage-grouse would apply to approximately 183,900 acres within the decision area. By imposing greater limitations for the siting of geothermal plants and infrastructure, impacts on special status species and their habitats would be reduced.

Table 2-5
Summary of Impacts in the Decision Areas by Resource and Alternative

	Alternative 1 - Proposed Action	Alternative 2 - Proposed Action with Enhanced Stipulations for Sage-grouse, and Traditional Cultural Properties (TCPs) and Sacred Sites	Alternative 3 - No Action Alternative	Alternative 4 (Preferred Alternative) - Proposed Action with Updated Sage-grouse Management
		and development.	fragmented and segregated planning for special status species and potential habitats which often exponentially increases impacts.	
Austin Decision Area	One plant would be constructed resulting in up to 367 acres would be permanently disturbed. The greatest impacts from geothermal leasing are likely in the sagebrush vegetation community and the special status species that depend on this habitat type, such as pygmy rabbit, greater sage-grouse, and Toquima milkvetch. NSOs for sage-grouse would be applied, which would protect habitats and special status species from disturbance in these areas. There are no water bodies, riparian areas, or wetlands within the decision area, so there would be no impacts on species that depend on these habitats. NSO, CSU, and TL stipulations would be as described for the Bridgeport Geothermal Decision Area.	Impacts on sage-grouse would be the same as those described for the Bridgeport Geothermal Decision Area.	Under Alternative 3, impacts would be the same as those described for the Bridgeport Geothermal Decision Area.	Impacts under Alternative 4 would be similar to those described for Alternative 1. However, the acreage subject to NSO for sage-grouse would increase to approximately 3,110 acres within the decision area. By imposing greater limitations for the siting of geothermal plants and infrastructure, impacts on special status species and their habitats would be reduced.

Table 2-5
Summary of Impacts in the Decision Areas by Resource and Alternative

	Alternative 1 - Proposed Action	Alternative 2 - Proposed Action with Enhanced Stipulations for Sage-grouse, and Traditional Cultural Properties (TCPs) and Sacred Sites	Alternative 3 - No Action Alternative	Alternative 4 (Preferred Alternative) - Proposed Action with Updated Sage-grouse Management
Ely Decision Area	One plant would be constructed resulting in up to 367 acres would be permanently disturbed. The greatest impacts from geothermal leasing are likely in the sagebrush vegetation community and the special status species that depend on this habitat.	Impacts on sage-grouse would be the same as those described for the Bridgeport Geothermal Decision Area.	Under Alternative 3, impacts would be the same as those described for the Bridgeport Geothermal Decision Area.	Impacts under Alternative 4 would be similar to those described for Alternative 1. The acreage subject to NSO for sage-grouse would decrease to approximately 800 acres within the decision area. This could allow for greater impacts on special status species and their habitats.
Tonopah Decision Area	One plant would be constructed resulting in up to 367 acres being permanently disturbed The greatest impacts from geothermal leasing are likely in the salt desert shrub and semi desert shrub vegetation community and the special status species that depend on these habitat types, such as foraging sensitive bats and birds, and rare plants such as Eastwood milkweed. There are no water bodies, riparian areas, or wetlands within the decision area, so there would be no impacts on species that depend on these habitats.	Impacts would be similar to those described for Alternative 1. Impacts on sage-grouse would be as described for the Bridgeport Geothermal Decision Area.	Under Alternative 3, impacts would be the same as those described for the Bridgeport Geothermal Decision Area.	Impacts under Alternative 4 would be similar to those described for Alternative 1. Acreage subject to NSO would increase and would incorporate the most recent science known about the greater sage-grouse.

Table 2-5
Summary of Impacts in the Decision Areas by Resource and Alternative

	Alternative 1 - Proposed Action	Alternative 2 - Proposed Action with Enhanced Stipulations for Sage-grouse, and Traditional Cultural Properties (TCPs) and Sacred Sites	Alternative 3 - No Action Alternative	Alternative 4 (Preferred Alternative) - Proposed Action with Updated Sage-grouse Management
Wild Horses and Burros				
Bridgeport Decision Area	Up to six power plants would be developed, disturbing up to 2,202 acres. There are two Wild Horse and Burro Territories occurring in the decision area. Alternative 1 would not have any direct impact on Wild Horses and Burros; however, anticipated geothermal exploration and development activities likely to follow leasing would potentially result in impacts.	Impacts under Alternative 2 would be similar to those described for Alternative 1. However, additional protection measures for greater sage-grouse and Native American concerns would increase the acreage that would be protected with an NSO sage-grouse stipulation on approximately 169,600 acres.	Alternative 3 would not make a consent determination for lands within the decision area. Processing of geothermal lease applications and nominations would continue; however, they would be evaluated on a case-by-case basis under separate NEPA analyses.	Impacts under Alternative 4 would be similar to those described for Alternative 1. However, the updated habitat data and protection measures for greater sage-grouse (including the bi-state population) would increase the acreage subject to sage-grouse NSO stipulations to approximately 183,900 acres.
Austin Decision Area	Wild Horse and Burro Territories are not present in the Austin Geothermal Decision Area; therefore, Alternative 1 would not have any direct impact on Wild Horses and Burros.	Wild Horse and Burro Territories are not present in the Austin Geothermal Decision Area; therefore, Alternative 2 would not have any direct impact on Wild Horses and Burros.	Wild Horse and Burro Territories are not present in the Austin Geothermal Decision Area; therefore, Alternative 3 would not have any direct impact on Wild Horses and Burros.	Wild Horse and Burro Territories are not present in the Austin Geothermal Decision Area; therefore, Alternative 4 would not have any direct impact on Wild Horses and Burros.
Ely Decision Area	Wild Horse and Burro Territories are not present in the Ely Geothermal Decision Area; therefore, Alternative 1 would not have any direct impact on Wild Horses and Burros.	Wild Horse and Burro Territories are not present in the Ely Geothermal Decision Area; therefore, Alternative 2 would not have any direct impact on Wild Horses and Burros.	Wild Horse and Burro Territories are not present in the Ely Geothermal Decision Area; therefore, Alternative 3 would not have any direct impact on Wild Horses and Burros.	Wild Horse and Burro Territories are not present in the Ely Geothermal Decision Area; therefore, Alternative 2 would not have any direct impact on Wild Horses and Burros.

Table 2-5
Summary of Impacts in the Decision Areas by Resource and Alternative

	Alternative 1 - Proposed Action	Alternative 2 - Proposed Action with Enhanced Stipulations for Sage-grouse, and Traditional Cultural Properties (TCPs) and Sacred Sites	Alternative 3 - No Action Alternative	Alternative 4 (Preferred Alternative) - Proposed Action with Updated Sage-grouse Management
Tonopah Decision Area	Wild Horse and Burro Territories are not present in the Tonopah Geothermal Decision Area; therefore, Alternative 1 would not have any direct impact on Wild Horses and Burros.	Wild Horse and Burro Territories are not present in the Tonopah Geothermal Decision Area; therefore, Alternative 2 would not have any direct impact on Wild Horses and Burros.	Wild Horse and Burro Territories are not present in the Tonopah Geothermal Decision Area; therefore, Alternative 3 and RFD would not have any direct impact on Wild Horses and Burros.	Wild Horse and Burro Territories are not present in the Tonopah Geothermal Decision Area; therefore, Alternative 4 would not have any direct impact on Wild Horses and Burros.
Livestock Grazing				
Bridgeport Decision Area	Up to 2,202 acres would be disturbed. Direct impacts on livestock grazing would not occur from leasing; however, geothermal exploration and development activities likely to follow leasing would potentially result in such impacts. There are 31 grazing allotments resulting in a potential for impacts, including a reduction in forage and possible reductions in AUMs.	Impacts under Alternative 2 would be similar to those described for Alternative 1. However, additional protection measures for greater sage-grouse and Native American concerns would increase the acreage that would be subject to NSO stipulations for sage-grouse to approximately 169,600 acres.	Alternative 3 would not make consent determination on lands within the decision area. Processing of geothermal lease applications and nominations would continue; however, they would be evaluated on a case-by-case basis under separate NEPA analyses. Leasing on a case-by-case basis could result in fragmentation of future development could increase impacts on livestock grazing.	Impacts under Alternative 4 would be similar to those described for Alternative 1. However, the updated habitat data and protection measures for greater sage-grouse (including the bi-state population) would increase the acreage subject to NSO stipulations for sage-grouse to approximately 183,900 acres.
Austin Decision Area	Up to 367 acres would be disturbed. Alternative 1 would not have any direct impact on livestock grazing resources; however, anticipated geothermal exploration and development activities likely to follow leasing would potentially result in such impacts. There is one grazing allotment in the	Impacts under Alternative 2 would be similar to those described for Alternative 1. However, additional protection measures for greater sage-grouse and Native American concerns would increase the acreage that would be subject to NSO stipulations for sage-grouse to approximately 1,600 acres.	Impacts associated with Alternative 3 would be the same as those described for the Bridgeport Geothermal Decision Area.	Impacts on livestock grazing would be similar to those described for the Bridgeport Geothermal Decision Area. However, the NSO stipulations for sage-grouse would apply to approximately 3,110 acres.

Table 2-5
Summary of Impacts in the Decision Areas by Resource and Alternative

	Alternative 1 - Proposed Action	Alternative 2 - Proposed Action with Enhanced Stipulations for Sage-grouse, and Traditional Cultural Properties (TCPs) and Sacred Sites	Alternative 3 - No Action Alternative	Alternative 4 (Preferred Alternative) - Proposed Action with Updated Sage-grouse Management
	Austin Geothermal Decision Area covering 3,920 acres, and the allotment has no known active AUMs.			
Ely Decision Area	Up to 367 acres would be disturbed. Alternative 1 would not have any direct impact on livestock grazing resources; however, anticipated geothermal exploration and development activities likely to follow leasing would potentially result in such impacts. There is one grazing allotment in the Ely Geothermal Decision Area covering 3,525 acres, and the allotment has no known active AUMs.	Impacts under Alternative 2 would be similar to those described for Alternative 1. However, additional protection measures for greater sage-grouse and Native American concerns would increase the acreage that would be subject to NSO stipulations for sage-grouse to approximately 3,300 acres.	Impacts associated with Alternative 3 would be the same as those described for the Bridgeport Geothermal Decision Area.	Impacts under Alternative 4 would be similar to those described for Alternative 1. However, the updated habitat data and protection measures for greater sage-grouse would decrease the acreage subject to NSO stipulations for sage-grouse to approximately 800 acres.
Tonopah Decision Area	Up to 166 acres would be disturbed. There are no know grazing allotments in the Tonopah Geothermal Decision Area therefore, there would be no impacts on livestock grazing.	Impacts under Alternative 2 would be similar to those described for Alternative 1. However, additional protection measures for Native American concerns would increase the acreage that would be subject to NSO stipulations	Impacts associated with Alternative 3 would be the same as those described for the Bridgeport Geothermal Decision Area.	Impacts under Alternative 4 would be similar to those described for Alternative 1. However, the updated habitat data and protection measures for the greater sage-grouse would increase the acreage subject to NSO stipulations to the entire decision area. Therefore, impacts on livestock grazing would be minimal.

Table 2-5
Summary of Impacts in the Decision Areas by Resource and Alternative

	Alternative 1 - Proposed Action	Alternative 2 - Proposed Action with Enhanced Stipulations for Sage-grouse, and Traditional Cultural Properties (TCPs) and Sacred Sites	Alternative 3 - No Action Alternative	Alternative 4 (Preferred Alternative) - Proposed Action with Updated Sage-grouse Management
Cultural Resources				
Bridgeport Decision Area	Up to 2,202 acres would be disturbed. As there are many known cultural resources within the decision area and several eligible sites, there would be a high likelihood that these or unknown sites could be impacted as a result of geothermal development. Most of the cultural resources that could be encountered could be avoided or mitigated to reduce impacts by the implementation of NSO and CSU stipulations. If cultural resources are determined to be within the area of effect of proposed development, then other standard cultural resources stipulations would be applied.	Impacts under this alternative would be similar in nature and type as those described under Alternative 1. However, under Alternative 2, a one mile buffer around TCPs would be applied, which would create a larger protection area around them and reduce the likelihood for impacts. There would not only be no direct impact from a potential development, the stricter stipulation under this alternative would also reduce indirect visual, aural, and atmospheric impacts.	Under Alternative 3, lease applications would continue to be processed on a case-by-case basis. Areas closed to geothermal leasing by statute, regulation, or orders would remain closed, and discretionary closed areas would be assessed based on the LRMPs. Issuing geothermal leases on a case-by-case basis is not expected to affect cultural resources.	Impacts under Alternative 4 would be similar to those described for Alternative 1. However, the updated habitat data and protection measures for greater sage-grouse (including the bi-state population) would increase the acreage subject to NSO.
Austin Decision Area	Up to 367 acres would be disturbed. As there are many known cultural resources within the area, there would be a high likelihood that known or anticipated sites could be impacted as a result of geothermal development. Most of the cultural resources that could be encountered could be	Impacts under this alternative would be similar in nature and type as those described under Alternative 1. However, under Alternative 2, a one mile buffer around TCPs would be applied, which would create a larger protection area around them and reduce the likelihood for impacts to low or moderate. Direct	Impacts would be the same as those described for the Bridgeport Geothermal Decision Area.	Impacts on cultural resources would be similar to those described for the Bridgeport Geothermal Decision Area. However, the NSO stipulations for sage-grouse would apply to approximately 3,110 acres.

Table 2-5
Summary of Impacts in the Decision Areas by Resource and Alternative

	Alternative 1 - Proposed Action	Alternative 2 - Proposed Action with Enhanced Stipulations for Sage-grouse, and Traditional Cultural Properties (TCPs) and Sacred Sites	Alternative 3 - No Action Alternative	Alternative 4 (Preferred Alternative) - Proposed Action with Updated Sage-grouse Management
	avoided or mitigated to reduce geothermal development impacts.	impacts would be reduced from a potential development and the stricter stipulation under this alternative would further reduce indirect visual, aural, and atmospheric impacts.		
Ely Decision Area	Up to 367 acres would be disturbed. As there are over 50 known cultural resources within the area, there would be a high likelihood that known or anticipated sites could be impacted. Further, since there are eligible sites in the decision area there is a moderate likelihood for impacting known eligible sites. Most of the cultural resources that could be encountered could be avoided or mitigated to reduce impacts.	Impacts would be similar to those described for the Bridgeport Geothermal Decision Area. The NSO stipulations for sage-grouse under this alternative would apply to approximately 3,300 acres within the decision area, reducing any impacts on cultural resources.	Impacts would be the same as those described for the Bridgeport Geothermal Decision Area.	Impacts under Alternative 4 would be similar to those described for Alternative 1. However, the updated habitat data and protection measures for greater sage-grouse would decrease the acreage subject to NSO.
Tonopah Decision Area	Up to 166 acres would be disturbed. As there are so few known cultural resources within the area, there would be a low likelihood that known or anticipated sites could be impacted. As stated previously, most of the cultural resources could be avoided or mitigated to reduce impacts by implementation of NSO and	Impacts would be similar to those described for the Bridgeport Geothermal Decision Area	Impacts would be the same as those described for the Bridgeport Geothermal Decision Area.	The updated habitat data and protection measures for greater sage-grouse would increase the acreage subject to NSO and restrict geothermal development within the entire decision area. Therefore impacts on cultural resources would be minimal.

Table 2-5
Summary of Impacts in the Decision Areas by Resource and Alternative

	Alternative 1 - Proposed Action	Alternative 2 - Proposed Action with Enhanced Stipulations for Sage-grouse, and Traditional Cultural Properties (TCPs) and Sacred Sites	Alternative 3 - No Action Alternative	Alternative 4 (Preferred Alternative) - Proposed Action with Updated Sage-grouse Management
	CSU stipulations.			
Tribal Interests and Traditional Cultural Resources				
Bridgeport Decision Area	Up to 2,202 acres would be disturbed. As there are many known important and significant traditional and heritage resources within the decision area, there would be a high likelihood that they could be directly and/or indirectly impacted. Many of the traditional and heritage resources that may be encountered could be avoided or mitigated to reduce direct impacts. Indirect impacts on traditional resources, such as visual, aural, and/or atmospheric intrusions are more difficult to mitigate or avoid, and are best addressed through intensive tribal consultation.	Impacts under this alternative would be similar in nature and type as those described above under Common Impacts Associated with Geothermal Development and Alternative 1. However, under Alternative 2, a 1 (one) mile buffer around TCPs and Native American sacred sites would be applied, which would create a larger protection area around these resources and reduce the likelihood for impacts to low.	Under Alternative 3, lease applications would continue to be processed on a case-by-case basis. Areas closed to geothermal leasing by statute, regulation, or orders would remain closed, and discretionary closed areas would be assessed based on the LRMP. The number of acres likely to be affected under this alternative is unknown. Issuing geothermal leases on a case-by-case basis would result in direct and indirect effects. The case-specific consultation required prior to issuance of a lease is expected to avoid and/or mitigate direct and indirect impacts on traditional and heritage resources.	Impacts under Alternative 4 would be similar to those described for Alternative 2. However, the updated habitat data and protection measures for greater sage-grouse (including the bi-state population) would increase the acreage subject to NSO.
Austin Decision Area	Up to 367 acres would be disturbed. As there are some known important and significant traditional and heritage resources within the decision area, there would be a moderate likelihood that they could be directly and/or	Impacts under this alternative would be similar in nature and type as those described above under Common Impacts Associated with Geothermal Development and Alternative 1. However, under Alternative 2, a 1 (one) mile buffer around TCPs	Impacts under Alternative 3 would be the same as those described for the Bridgeport Geothermal Decision Area.	Impacts on tribal interests and traditional cultural resources would be similar to those described for the Bridgeport Geothermal Decision Area.

Table 2-5
Summary of Impacts in the Decision Areas by Resource and Alternative

	Alternative 1 - Proposed Action	Alternative 2 - Proposed Action with Enhanced Stipulations for Sage-grouse, and Traditional Cultural Properties (TCPs) and Sacred Sites	Alternative 3 - No Action Alternative	Alternative 4 (Preferred Alternative) - Proposed Action with Updated Sage-grouse Management
	indirectly impacted. Many of the traditional and heritage resources that may be encountered could be avoided or mitigated to reduce direct impacts. Indirect impacts on traditional resources, such as visual, aural, and/or atmospheric intrusions are more difficult to mitigate or avoid, and are best addressed through intensive tribal consultation.	and Native American sacred sites) would be applied, which would create a larger protection area around these resources and reduce the likelihood for impacts to low. There would not only be no direct impact from a potential development, the stricter stipulation under this alternative would further reduce indirect visual, aural or atmospheric impacts		
Ely Decision Area	Up to 367 acres would be disturbed, and impacts would be the same as those described for the Bridgeport Geothermal Decision Area.	Impacts under Alternative 2 would be similar to those described for the Bridgeport Geothermal Decision Area.	Impacts under Alternative 3 would be the same as those described for the Bridgeport Geothermal Decision Area.	Impacts under Alternative 4 would be similar to those described for Alternative 1.
Tonopah Decision Area	Up to 166 acres would be disturbed. There are few known important and significant traditional and heritage resources within and adjacent to the area, indicating that there would only be a slight chance that they could be directly and/or indirectly impacted. Many of the traditional and heritage resources that may be encountered could be avoided or mitigated to reduce direct impacts. Indirect impacts on	Impacts under this alternative would be similar in nature and type as those described above under Common Impacts Associated with Geothermal Development and Alternative 1. Under Alternative 2, a 1 (one) mile buffer around TCPs and Native American sacred sites would be applied, which would create a larger protection area around these resources. As there are few important or significant sites within this area,	Impacts under Alternative 3 would be the same as those described for the Bridgeport Geothermal Decision Area.	Impacts under Alternative 4 would be similar to those described for Alternative 2. However, the updated habitat data and protection measures for the greater sage-grouse would increase the acreage subject to NSO stipulations to the entire decision area, reducing impacts on tribal interests and traditional cultural resources.

Table 2-5
Summary of Impacts in the Decision Areas by Resource and Alternative

	Alternative 1 - Proposed Action	Alternative 2 - Proposed Action with Enhanced Stipulations for Sage-grouse, and Traditional Cultural Properties (TCPs) and Sacred Sites	Alternative 3 - No Action Alternative	Alternative 4 (Preferred Alternative) - Proposed Action with Updated Sage-grouse Management
	traditional resources, such as visual, aural, and/or atmospheric intrusions are more difficult to mitigate or avoid, and are best addressed through intensive tribal consultation. If traditional and heritage resources are determined to be within the area of effect of proposed development, then the application of a buffer and other mitigation measures would occur.	this stipulation would reduce the likelihood for impacts to low or negligible.		
National Scenic and Historical Trails				
Bridgeport Decision Area	Up to 2,202 acres would be disturbed. Alternative 1 would not have any direct impact on National Scenic and Historic Trails; however, anticipated geothermal exploration and development activities likely to follow leasing would potentially result in impacts.	Impacts under Alternative 2 would be similar to those described for Alternative 1. However, additional protection measures for greater sage-grouse and Native American concerns would increase the acreage that would be subject to NSO stipulations.	Alternative 3 would not lead to consent or non-consent for lands within the decision area. Processing of geothermal lease applications and nominations would continue; however, they would be evaluated on a case-by-case basis under separate NEPA analyses.	Impacts under Alternative 4 would be similar to those described for Alternative 1. However, the updated habitat data and protection measures for greater sage-grouse (including the bi-state population) would increase the acreage subject to NSO.
Austin Decision Area	Up to 367 acres would be disturbed. The Pony Express National Historic Trail is located approximately 2 miles south of the Austin Geothermal Decision Area and with the implementation of the CSU stipulation for sensitive	The impacts associated with Alternative 2 similar to those described for the Bridgeport Geothermal Decision Area	The impacts associated with Alternative 3 are the same as those described for the Bridgeport Geothermal Decision Area.	Impacts on national scenic and historic trails would be similar to those described for the Bridgeport Geothermal Decision Area.

Table 2-5
Summary of Impacts in the Decision Areas by Resource and Alternative

	Alternative 1 - Proposed Action	Alternative 2 - Proposed Action with Enhanced Stipulations for Sage-grouse, and Traditional Cultural Properties (TCPs) and Sacred Sites	Alternative 3 - No Action Alternative	Alternative 4 (Preferred Alternative) - Proposed Action with Updated Sage-grouse Management
	viewsheds, no impacts are anticipated.			
Ely Decision Area	There are no National Scenic or Historic Trails in the Ely Geothermal Decision Area; therefore, there would be no impacts on this resource from Alternative 1.	There are no National Scenic or Historic Trails in the Ely Geothermal Decision Area; therefore, there would be no impacts on this resource from Alternative 2.	There are no National Scenic or Historic Trails in the Ely Geothermal Decision Area; therefore, there would be no impacts on this resource from Alternative 3.	There are no National Scenic or Historic Trails in the Ely Geothermal Decision Area; therefore, there would be no impacts on this resource from Alternative 4.
Tonopah Decision Area	There are no National Scenic or Historic Trails in the Tonopah Geothermal Decision Area; therefore, there would be no impacts on this resource from Alternative 1.	There are no National Scenic or Historic Trails in the Tonopah Geothermal Decision Area; therefore, there would be no impacts on this resource from Alternative 2.	There are no National Scenic or Historic Trails in the Tonopah Geothermal Decision Area; therefore, there would be no impacts on this resource from Alternative 3.	There are no National Scenic or Historic Trails in the Tonopah Geothermal Decision Area; therefore, there would be no impacts on this resource from Alternative 4.
Visual				
Bridgeport Decision Area	Alternative 1 would not have any direct impact on visual resources; however, anticipated geothermal exploration and development activities likely to follow leasing would. All geothermal development would be sited with consideration to Visual Quality Objectives. BMPs would minimize impacts. It is assumed the stipulations would result in positioning new structures, roads, and operations in the landscape so they would remain visually	Impacts under Alternative 2 would be similar to those described for Alternative 1. However, additional protection measures for greater sage-grouse and Native American concerns would increase the acreage that would be protected with an NSO stipulation for sage-grouse to approximately 169,600 acres within the decision area. The additional stipulations under Alternative 2 would further protect viewsheds as described for Alternative 1.	Issuing geothermal leases on a case-by-case basis is not expected to directly affect visual resources. Visual resources would continue to be managed consistently with current designations. In the absence of consenting to lease lands within the Bridgeport Geothermal Development Area, no regionally specific lease stipulations for geothermal leasing, lease nominations, and project development would result. Therefore, Alternative 3	Impacts under Alternative 4 would be similar to those described for Alternative 2. However, the updated habitat data and protection measures for greater sage-grouse (including the bi-state population) would increase the acreage subject to NSO stipulations for sage-grouse to approximately 183,900 acres.

Table 2-5
Summary of Impacts in the Decision Areas by Resource and Alternative

	Alternative 1 - Proposed Action	Alternative 2 - Proposed Action with Enhanced Stipulations for Sage-grouse, and Traditional Cultural Properties (TCPs) and Sacred Sites	Alternative 3 - No Action Alternative	Alternative 4 (Preferred Alternative) - Proposed Action with Updated Sage-grouse Management
	subordinate to the characteristic landscape, and would result in landform and vegetation alterations that blend in with the surrounding landscape character.		would have less defined protection of visual resources than Alternative 1.	
Austin Decision Area	Impacts on visual resources in the Austin Geothermal Decision Area would be similar to those described for the Bridgeport Geothermal Decision Area. It is anticipated that impacts would be minimized due to the implementation of BMPs and additional lease stipulations.	Impacts on visual resources would be similar to those described for the Bridgeport Geothermal Decision Area. The NSO stipulations for sage-grouse would apply to approximately 1,600 acres.	Impacts on visual resources would be similar to those described for the Bridgeport Geothermal Decision Area.	Impacts on visual resources would be similar to those described for the Bridgeport Geothermal Decision Area. However, the NSO stipulations for sage-grouse would apply to approximately 3,110 acres. Therefore impacts on visual resources would be minimal.
Ely Decision Area	Impacts on visual resources in the Ely Geothermal Decision Area would be similar to those described for the Bridgeport Geothermal Decision Area. It is anticipated that impacts under Alternative 1 would be minimized due to the implementation of BMPs and additional lease stipulations.	Impacts on visual resources would be similar to those described for the Bridgeport Geothermal Decision Area. The NSO stipulations for sage-grouse would apply to approximately 3,300 acres.	Impacts on visual resources would be the same as those described for the Bridgeport Geothermal Decision Area.	Impacts under Alternative 4 would be similar to those described for the Bridgeport Geothermal Decisions Area. However, the updated habitat data and protection measures for greater sage-grouse would decrease the acreage subject to NSO stipulations to approximately 800 acres.
Tonopah Decision Area	Impacts on visual resources in the Tonopah Geothermal Decision Area would be similar to those described for the Bridgeport Geothermal	Impacts on visual resources would be similar to those described for the Bridgeport Geothermal Decision Area. An increase in NSO acres within the	Impacts on visual resources would be the same as those described for the Bridgeport Geothermal Decision Area.	Impacts under Alternative 4 would be similar to those described for Alternative 2. However, the updated habitat data and protection measures

Table 2-5
Summary of Impacts in the Decision Areas by Resource and Alternative

	Alternative 1 - Proposed Action	Alternative 2 - Proposed Action with Enhanced Stipulations for Sage-grouse, and Traditional Cultural Properties (TCPs) and Sacred Sites	Alternative 3 - No Action Alternative	Alternative 4 (Preferred Alternative) - Proposed Action with Updated Sage-grouse Management
	Decision Area. Due to the small size of the decision area, there would be less flexibility in siting a geothermal plant and infrastructure, which could increase the likelihood of adverse impacts on visual resources on adjacent lands. It is anticipated that impacts would be the minimized due to the implementation of BMPs and additional lease stipulations.	decision area would be directly related to the stipulations for Native American concerns.		for sage-grouse would increase the acreage subject to NSO and restrict geothermal development within the entire decision area.
Social Interests, Economics, and Environmental Justice				
Bridgeport Decision Area	Alternative 1 would not have direct impacts on environmental justice; however, geothermal exploration, development, and abandonment activities likely to follow leasing would potentially result in impacts on socioeconomics. Lease stipulations, such as NSO, CSU, and timing limitations, would be applied based on site-specific resources. Stipulations and BMPs under Alternative 1 would limit the impacts on area resources and other existing land uses, thereby decreasing the likelihood that economic and social benefits derived from	Impacts under Alternative 2 would be similar to those described for Alternative 1. However, additional protection measures for greater sage-grouse and Native American concerns would increase the acreage that would be subject to NSO stipulations for sage-grouse to approximately 169,600 acres.	The specific economic impacts of this alternative cannot be determined. Impacts would occur during subsequent exploration, drilling operations, and utilization phases. Impacts would vary depending on specific locations developed for geothermal resources. Consent to lease lands would not be granted for the decision area lands but would be dealt with on a case-by-case basis, and no regionally specific lease stipulations would be applied. Alternative 3 would provide the less defined protection for socioeconomics and	Impacts under Alternative 4 would be similar to those described for Alternative 1. However, the updated habitat data and protection measures for greater sage-grouse (including the bi-state population) would increase the acreage subject to NSO stipulations for sage-grouse to approximately 183,900 acres. This alternative would result in greater limitations for the siting of geothermal plants and infrastructure, which could limit development and result in a greater impact to social and economic interests.

Table 2-5
Summary of Impacts in the Decision Areas by Resource and Alternative

	Alternative 1 - Proposed Action	Alternative 2 - Proposed Action with Enhanced Stipulations for Sage-grouse, and Traditional Cultural Properties (TCPs) and Sacred Sites	Alternative 3 - No Action Alternative	Alternative 4 (Preferred Alternative) - Proposed Action with Updated Sage-grouse Management
	these resources would be impacted.		environmental justice than Alternative 1.	
Austin Decision Area	No direct impact on socioeconomics or environmental justice would occur; however, geothermal exploration, development, and abandonment activities likely to follow leasing would potentially result in such impacts. Lease stipulations, such as NSO, CSU, and TLs, as well as BMPs would be applied based on site-specific resources.	Impacts under Alternative 2 would be similar to those described for Alternative 1. However, additional protection measures for greater sage-grouse and Native American concerns would increase the acreage that would be subject to NSO stipulations for sage-grouse to approximately 1,600 acres.	Impacts on socioeconomics and environmental justice would be the same as those described for the Bridgeport decision area.	Impacts on social interests, economics, and environmental justice would be similar to those described for the Bridgeport Geothermal Decision Area. However, the NSO stipulations for sage-grouse would apply to approximately 3,110 acres within the decision area.
Ely Decision Area	Impacts on socioeconomics and environmental justice would be the same as those described for the Austin Geothermal Decision Area.	Impacts on socioeconomics and environmental justice would be similar to those described for the Austin Geothermal Decision Area. The NSO stipulations for sage-grouse would apply to approximately 3,300 acres.	Impacts on socioeconomics and environmental justice would be the same as those described for the Bridgeport Geothermal Decision Area.	Impacts under Alternative 4 would be similar to those described for Alternative 1. However, the updated habitat data and protection measures for greater sage-grouse would decrease the acreage subject to NSO stipulations to approximately 800 acres.
Tonopah Decision Area	Impacts on socioeconomics and environmental justice would be the same as those described for the Austin Geothermal Decision Area.	Impacts on socioeconomics and environmental justice would be similar to those described for the Austin Geothermal Decision Area.	Impacts on socioeconomics and environmental justice would be the same as those described for the Bridgeport Geothermal Decision Area.	Impacts under Alternative 4 would be similar to those described for Alternative 1. However, the updated habitat data and protection measures for sage-grouse would increase the acreage subject to NSO stipulations to the entire

Table 2-5
Summary of Impacts in the Decision Areas by Resource and Alternative

	Alternative 1 - Proposed Action	Alternative 2 - Proposed Action with Enhanced Stipulations for Sage-grouse, and Traditional Cultural Properties (TCPs) and Sacred Sites	Alternative 3 - No Action Alternative	Alternative 4 (Preferred Alternative) - Proposed Action with Updated Sage-grouse Management
				decision area restricting geothermal development.
Health and Safety				
Bridgeport Decision Area	There would be no increase in human exposure to hazards from geothermal leasing allocation decisions; however, impacts resulting from anticipated future actions consistent with implementing Alternative 1 would be of the same nature and character as those described under Common Impacts associated with Geothermal Development.	Impacts under Alternative 2 would be similar to those described for Alternative 1. However, additional protection measures for greater sage-grouse and Native American concerns would increase the acreage that would be subject to NSO stipulations for sage-grouse to approximately 169,600 acres.	Impacts under Alternative 3 would be the same as described for Alternative 1, above.	Impacts under Alternative 4 would be similar to those described for Alternative 1. However, the updated habitat data and protection measures for greater sage-grouse (including the bi-state population) would increase the acreage subject to NSO For sage-grouse to approximately 183,900 acres.
Austin Decision Area	Impacts related to public health and safety from reasonably foreseeable future actions would be the same as described above for the Bridgeport Decision Area.	Impacts related to public health and safety from reasonably foreseeable future actions would be similar to those described for the Bridgeport Decision Area. The NSO stipulations for sage-grouse would apply to approximately 1,600 acres.	Impacts under Alternative 3 would be the same as described for Alternative 1, above.	Impacts on health and safety would be similar to those described for the Bridgeport Geothermal Decision Area. However, the NSO stipulations for sage-grouse would apply to approximately 3,110 acres.
Ely Decision Area	Impacts related to public health and safety from reasonably foreseeable future actions would be the same as described for the Bridgeport Geothermal Decision Area.	Impacts related to public health and safety from reasonably foreseeable future actions would be similar to those described for the Bridgeport Decision Area. The NSO stipulations for sage-grouse would apply to	Impacts under Alternative 3 would be the same as described for Alternative 1, above.	Impacts under Alternative 4 would be similar to those described for Alternative 1. However, the updated habitat data and protection measures for greater sage-grouse would decrease the acreage subject

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Summary of Impacts in the Decision Areas by Resource and Alternative

	Alternative 1 - Proposed Action	Alternative 2 - Proposed Action with Enhanced Stipulations for Sage-grouse, and Traditional Cultural Properties (TCPs) and Sacred Sites	Alternative 3 - No Action Alternative	Alternative 4 (Preferred Alternative) - Proposed Action with Updated Sage-grouse Management
		approximately 3,300 acres.		to NSO stipulations to approximately 800 acres.
Tonopah Decision Area	Impacts related to public health and safety from reasonably foreseeable future actions would be the same as described for the Bridgeport Geothermal Decision Area.	Impacts related to public health and safety from reasonably foreseeable future actions would be similar to those described for the Bridgeport Decision Area	Impacts under Alternative 3 would be the same as described for Alternative 1, above.	Impacts under Alternative 4 would be similar to those described for Alternative 1. However, the updated habitat data and protection measures for sage-grouse would increase the acreage subject to NSO and restrict geothermal development within the entire decision area.
Noise				
Bridgeport Decision Area	BLM Geothermal Resource Order Number 4, General Environmental Protection Requirements, mandates that noise from geothermal activities be 65 dBA or less at the lease boundary. Due to the highly rural and unpopulated nature of lands within the Bridgeport Geothermal Decision Area, it is unlikely that any sensitive receptors would be directly adjacent to any lease boundary. Noise impacts from reasonably foreseeable future actions are expected to be minimal.	Impacts under Alternative 2 would be similar to those described for Alternative 1. However, additional protection measures for greater sage-grouse and Native American concerns would increase the acreage that would be subject to NSO stipulations for sage-grouse to approximately 169,600 acres.	Impacts under Alternative 3 would be the same as described for Alternative 1, above.	Impacts under Alternative 4 would be similar to those described for Alternative 1. However, the updated habitat data and protection measures for greater sage-grouse (including the bi-state population) would increase the acreage subject to NSO for sage-grouse to approximately 183,900 acres.

Table 2-5
Summary of Impacts in the Decision Areas by Resource and Alternative

	Alternative 1 - Proposed Action	Alternative 2 - Proposed Action with Enhanced Stipulations for Sage-grouse, and Traditional Cultural Properties (TCPs) and Sacred Sites	Alternative 3 - No Action Alternative	Alternative 4 (Preferred Alternative) - Proposed Action with Updated Sage-grouse Management
Austin Decision Area	No noise impacts are expected under this alternative since no sensitive receptors have been identified within one mile of the Austin Geothermal Decision Area.	Impacts under Alternative 2 would be similar to those described for Alternative 1. The NSO stipulations for sage-grouse would apply to approximately 1,600 acres.	Impacts under Alternative 3 would be the same as described for Alternative 1, above.	Impacts on noise would be similar to those described for the Bridgeport Geothermal Decision Area. However, the NSO stipulations for sage-grouse would apply to approximately 3,110 acres.
Ely Decision Area	No noise impacts are expected from reasonably foreseeable future impacts since no sensitive receptors have been identified within one mile of the Ely Geothermal Decision Area.	Impacts under Alternative 2 would be similar to those described for Alternative 1. The NSO stipulations for sage-grouse would apply to approximately 3,300 acres.	Impacts under Alternative 3 would be the same as described for Alternative 1, above.	The updated habitat data and protection measures for greater sage-grouse would decrease the acreage subject to NSO stipulations to approximately 800 acres.
Tonopah Decision Area	No noise impacts are expected from reasonably foreseeable future impacts since no sensitive receptors have been identified adjacent to the Tonopah Geothermal Decision Area.	Impacts under Alternative 2 would be similar to those described for Alternative 1. However, additional protection measures for Native American concerns would increase the acreage subject to NSO stipulations, which would affect siting of a potential future geothermal plant.	Impacts under Alternative 3 would be the same as described for Alternative 1, above.	Impacts under Alternative 4 would be similar to those described for Alternative 1. However, the updated habitat data and protection measures for sage-grouse would increase the acreage subject to NSO and restrict geothermal development within the entire decision area.
Hazardous Materials				
Bridgeport Decision Area	There would be no increase in human or environmental exposure to hazardous materials from geothermal leasing allocation decisions; however, impacts resulting from	Impacts under Alternative 2 would be similar to those described for Alternative 1. However, additional protection measures for greater sage-grouse and Native American concerns	Impacts under Alternative 3 would be the same as described for Alternative 1, above.	Impacts under Alternative 4 would be similar to those described for Alternative 1. However, the updated habitat data and protection measures for greater sage-grouse

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Summary of Impacts in the Decision Areas by Resource and Alternative

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	anticipated future actions consistent with implementing Alternative 1 would be of the same nature and character as those described under Common Impacts associated with Geothermal Development.	would increase the acreage that would be subject to NSO stipulations for sage-grouse to approximately 169,600 acres.		(including the bi-state population) would increase the acreage subject to NSO stipulations for sage-grouse to approximately 183,900 acres.
Austin Decision Area	Impacts related to hazardous materials from Alternative 1 would be the same as described for the Bridgeport Geothermal Decision Area.	Impacts related to hazardous materials from Alternative 2 would be similar to those described for the Bridgeport Geothermal Decision Area. The NSO stipulations for sage-grouse would apply to approximately 1,600 acres.	Impacts under Alternative 3 would be the same as described for the Bridgeport Geothermal Decision Area.	Impacts on hazardous materials would be similar to those described for the Bridgeport Geothermal Decision Area. However, the NSO stipulations for sage-grouse would apply to approximately 3,110 acres.
Ely Decision Area	Impacts under Alternative 1 would be the same as described for the Bridgeport Geothermal Decision Area.	Impacts under Alternative 2 would similar to those described for the Bridgeport Geothermal Decision Area. The NSO stipulations for sage-grouse would apply to approximately 3,300 acres.	Impacts under Alternative 3 would be the same as described for the Bridgeport Geothermal Decision Area.	The updated habitat data and protection measures for greater sage-grouse would decrease the acreage subject to NSO stipulations to approximately 800 acres.
Tonopah Decision Area	Impacts under Alternative 1 would be the same as described for the Bridgeport Geothermal Decision Area.	Impacts under Alternative 2 would be similar to those described for Alternative 1. However, additional protection measures for Native American concerns would increase the acreage subject to NSO stipulations.	Impacts under Alternative 3 would be the same as described for the Bridgeport Geothermal Decision Area.	Impacts under Alternative 4 would be similar to those described for Alternative 1. However, the updated habitat data and protection measures for sage-grouse would increase the acreage subject to NSO and restrict geothermal development within the entire decision area.

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Summary of Impacts in the Decision Areas by Resource and Alternative

	Alternative 1 - Proposed Action	Alternative 2 - Proposed Action with Enhanced Stipulations for Sage-grouse, and Traditional Cultural Properties (TCPs) and Sacred Sites	Alternative 3 - No Action Alternative	Alternative 4 (Preferred Alternative) - Proposed Action with Updated Sage-grouse Management
Climate Change				
Bridgeport Decision Area	Indirect impacts would include the production of greenhouse gas emissions during all phases of geothermal development, including construction and well drilling. BMPs or measures designed to reduce equipment and vehicle exhaust emissions would reduce greenhouse gas emissions. Release of greenhouse gas emissions would depend upon plant technology and design. Greenhouse gas emissions from each 50-MW power plant would be expected to be well below the 25,000 tons per year reporting limit under the Greenhouse Gas Monitoring Rule. Geothermal power plant development could have an indirect beneficial impact if power produced by the geothermal plant displaced electricity generated by conventional fossil fuel sources of electricity.	Impacts under Alternative 2 would be similar to those described for Alternative 1. However, additional protection measures for greater sage-grouse and Native American concerns would increase the acreage that would be subject to NSO stipulations for sage-grouse to approximately 169,600 acres.	Under Alternative 3, lease applications would continue to be processed on a case-by-case basis. There is the potential that geothermal development could be delayed when compared with Alternative 1. Indirect impacts would be similar to those described for Alternative 1 but would likely occur at a slower pace.	Impacts under Alternative 4 would be similar to those described for Alternative 1. However, the updated habitat data and protection measures for greater sage-grouse (including the bi-state population) would increase the acreage subject to NSO stipulations for sage-grouse to approximately 183,900 acres within the decision area.
Austin Decision Area	Alternative 1 would have no direct impacts on climate change. Indirect impacts would be similar in type to those	Impacts under Alternative 2 would be similar to those described for Alternative 1. However, additional protection	Impacts on climate change would be the same as those described for the Bridgeport Geothermal Decision Area at a	Impacts on climate change would be similar to those described for the Bridgeport Geothermal Decision Area.

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Summary of Impacts in the Decision Areas by Resource and Alternative

	Alternative 1 - Proposed Action	Alternative 2 - Proposed Action with Enhanced Stipulations for Sage-grouse, and Traditional Cultural Properties (TCPs) and Sacred Sites	Alternative 3 - No Action Alternative	Alternative 4 (Preferred Alternative) - Proposed Action with Updated Sage-grouse Management
	described for the Bridgeport Geothermal Decision Area but would be much less in scale because the Austin Geothermal Decision Area has 50 MW of geothermal potential compared with 228 MW of potential for the Bridgeport decision area.	measures for greater sage-grouse and Native American concerns would increase the acreage that would be subject to NSO stipulations for sage-grouse to approximately 1,600 acres.	lesser scale.	However, the NSO stipulations for sage-grouse would apply to approximately 3,110 acres.
Ely Decision Area	Impacts on climate change would be the same as those described for the Austin Geothermal Decision Area.	Impacts on climate change would be similar to those described for the Austin Geothermal Decision Area. The NSO stipulations for sage-grouse would apply to approximately 3,300 acres.	Impacts on climate change would be the same as those described for the Austin Geothermal Decision Area.	The updated habitat data and protection measures for greater sage-grouse would decrease the acreage subject to NSO for sage-grouse to approximately 800 acres.
Tonopah Decision Area	Impacts on climate change would be the same as those described for the Austin Geothermal Decision Area.	Impacts on climate change would be similar to those described for the Austin Geothermal Decision Area.	Impacts on climate change would be the same as those described for the Austin Geothermal Decision Area.	Impacts under Alternative 4 would be similar to those described for the Austin Geothermal Area. However, the updated habitat data and protection measures for sage-grouse would increase the acreage subject to NSO and restrict geothermal development within the entire decision area.